CMAG
Chronic Obstructive Pulmonary Disease (COPD)

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Introduction

In 2004, the Case Management Society of America (CMSA) introduced a set of guiding principles and associated tools that were developed to aid in the assessment, planning, facilitation, and advocacy of patient adherence. Entitled the Case Management Adherence Guidelines (CMAG), these concepts were designed to advance the goal of creating an environment of structured interaction, based on patient-specific needs that would encourage patient adherence with all aspects of the prescribed treatment plan. CMAG was written for the purpose of assisting the care management professional and other healthcare professionals in facilitating education and motivation with the end outcome of medication adherence.

Over the ensuing years, thousands of healthcare professionals attended CMAG educational workshops throughout the United States and downloaded the workbook at www.cmsa.org. CMAG Workbooks comprehensively detail all CMAG tools and supportive knowledge was made available in multiple languages, including English, Spanish, French, and Korean. Subsequently, CMAG was recognized as the primary educational standard for case managers that present a collaborative approach for affecting patient-specific health behavior change and for advancing patient adherence.

The basic CMAG program was general and focused on all patients in which the care management professional and other healthcare collaborative partners would have as patients. The tool box included in the basic CMAG program is applicable to any patient. This disease-specific version’s focus of Chronic Obstructive Pulmonary Disease (COPD) will complement CMAG by offering patient-centered diagnosis and treatment-specific adherence improvement tools to the professional.

CMSA continues to provide CMAG educational workshops throughout the United States.

Copies of the CMAG manual and this Disease State Chapter addendums may be downloaded at no cost at www.cmsa.org/cmag.
Chronic Obstructive Pulmonary Disease (COPD)

In this volume we will review the following:

- The Definition of COPD
- Signs and Symptoms of COPD
- Diagnosing COPD
- Prevalent Treatment Modalities
- Four Components of COPD Management
- Adherence Challenges
- Adherence Tools
- Disease Burden and Population
- Case Management in Different Practice Settings
- Successful Discharge
- Outcomes in COPD
DEFINITION OF COPD

The current definition of COPD as defined in the Global Initiative for Chronic Obstructive Lung Disease (GOLD) Guidelines is:

“Chronic obstructive pulmonary disease is a preventable and treatable disease with some significant extra pulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases.”1

To further clarify the definition:

• COPD is preventable. There are a number of risk factors to consider, with cigarette smoking being the most common. Other potential risk factors seen around the world include occupational exposures, air pollution, and genetic factors.

• COPD is treatable with specific treatment modalities.

• The pulmonary component of COPD is characterized by airflow limitation. This airflow limitation is caused by small airway inflammation leading to airway remodeling (chronic bronchitis) and by loss of alveolar attachments and alveolar elasticity (emphysema). Each person with COPD has varying degrees of each component of airflow limitation.

• The airflow limitation is progressive, yet treatable.

• Exposure to noxious particles or gases, such as cigarette smoke, leads to the inflammatory response.

SIGNS AND SYMPTOMS OF COPD

Symptoms of COPD often begin slowly and insidiously. A person may feel breathlessness with exercise and initially may be identified as being “out of shape.” Exercise may then be limited to avoid the breathlessness, which then progresses and occurs during activities of daily living. This progressing symptom is often the reason a person visits the health care provider. Table 1, The MRC Scale, Modified Medical Research Council Questionnaire for Assessing the Severity of Breathlessness Scale, is a useful tool to identify the impact breathlessness has on the person’s health status. The person places a check in one box only.1
The classic symptoms of COPD include chronic and progressive dyspnea, cough, and sputum production. The cough may be productive or unproductive, and occurs sporadically, possibly progressing to a daily cough. The main risk factor to consider is a history of cigarette smoking. Other risk factors include occupational exposures, hobbies, genetics, and smoke from home heating and cooking sources.

The impact of COPD varies based on the symptom severity, especially breathlessness and decreased exercise capacity. Comorbid conditions seen with COPD can have a dramatic impact on its affect as well. Comorbid conditions often seen with COPD may include: weight loss, skeletal muscle dysfunction, cardiac disorders, osteoporosis, respiratory infections, bone fractures, depression, diabetes, sleep disorders, anemia, and glaucoma.

**ECONOMIC IMPACT**

The State of Healthcare Quality 2009 report published by the National Committee for Quality Assurance (NCQA) noted that the total annual estimated cost of COPD was $42.6 billion, including almost $26.7 billion in direct health care expenditures and $16 billion in indirect morbidity and mortality costs. As with most chronic illnesses, exacerbations that result in hospitalization increase the economic impact of the disease and contribute a significant portion of the direct medical costs. Employers are equally concerned with indirect costs and the impact COPD has in employee absenteeism and presenteeism.
Case managers have a role to play in reducing the economic burden through increasing early identification and diagnosis and working with patients to prevent exacerbations. Nearly 70% of patients with COPD are under the age of 65, and more than one half are women. Identifying common characteristics of the population will aid in earlier diagnosis and treatment strategies. COPD is commonly thought to be a disease of older people, and this may delay diagnosis and treatment if the case manager is not attuned to COPD in the 40 to 65 year old population.

DIAGNOSIS

There are numerous challenges to diagnosing COPD. Symptoms of COPD begin slowly and insidiously. Often, individuals do not present for treatment until they have moderate disease with enough impairment to make them short of breath with daily activities. Because of the often unrecognized early symptoms, there have been significant initiatives aimed at awareness and early recognition.

The physician has an opportunity for early recognition at the time of the history and physical examination. An individual with a history of current or past smoking, chronic cough, sputum production, dyspnea, decreasing physical activity, and exposure to occupational risk factors should cause the physician to suspect COPD.

The primary care provider is in an ideal position to identify initial symptoms and risk factors. Many of these opportunities are missed due to numerous reported barriers to the use of spirometry in primary care. The under use of spirometry is one reason COPD is often underdiagnosed and misdiagnosed in the primary care setting, even though spirometry is the current standard for demonstration of airflow inadequacy. Barriers to spirometry use in primary care include lack of knowledge, lack of time, and workflow issues. A study by Pamela Moore, PhD, reported that only 24% of the primary care practices used spirometry to make the diagnosis of COPD, and only 24% used spirometry after the diagnosis to monitor progression.

Recommended ways to improve the use of spirometry in primary care include changing office workflows and scheduling spirometry for people with identified symptoms and/or risk factors before the health care provider visit. Case managers can be instrumental in assisting with workflow changes, and in assuring an individual receives spirometry. Finally, it is important to differentiate COPD from other causes of airway disease; a detailed medical history and chest radiography may be used if early spirometry results are normal or near normal.
Once initial symptoms of COPD have been identified, spirometry is the gold standard to confirm the diagnosis and monitor disease progression. Spirometry is a standardized, reliable, and objective measure of lung function. Two measures that are often used with spirometry are Forced Vital Capacity (FVC) and Forced Expiratory Volume in one second (FEV₁).  

- FVC measures the volume of air exhaled forcefully and completely after a full inhalation.
- FEV₁ is the volume of air exhaled during the first second of the forced vital capacity.
- FEV₁ /FVC is a ratio of these two measures. A normal ratio is between 0.70 and 0.80.

The results of spirometry are compared to reference values of a population the same age, sex, height, race, and weight. The results of the FVC and FEV₁ are often reported as a percentage (percent predicted).

The Lung Health Study showed that spirometry can identify a subgroup of smokers who are at risk of developing obstructive airways disease at a rate much higher than previously thought (over 25%). Spirometry may help support clinical evaluation of individuals with a smoking history or other risks of developing pulmonary dysfunction.

The American Thoracic Society has specific standards for the use of spirometry. These standards address the importance of preparing the spirometer for testing, performing the test correctly, and evaluating the spirometry measures. These standards can be met in the primary care setting and/or specialty care setting, and must be accompanied by good skills training for the individuals conducting the testing and ongoing quality assurance program.

There are several types of spirometers available, and they are relatively inexpensive. Some are usually available only in a pulmonary function laboratory. These are large bellow or rolling seal types and cost about $2000. However, smaller handheld devices are often equipped with electronic calibration systems. Office spirometers cost between $600 and $1000, and performing the test takes just a few minutes to
Chronic Obstructive Pulmonary Disease (COPD) complete. Criteria for selection of spirometry equipment assures that the equipment meets the American Thoracic Society Standards for volume, inertia and resistance, zero time determination, accuracy, conversion to BTPS (body temperature, ambient pressure, saturated with water vapor), and recorder displays.

Spirometric technique is essential for achieving precise and accurate results. Basic technique includes preparation of the equipment to make sure it is properly cleaned, adequate supplies, proper calibration, a room with appropriate temperature and privacy, and equipment in good working order.

To ensure a meaningful result, the individuals should be fully instructed as follows:

• Explain or demonstrate how the procedure works to aid compliance and ease anxiety. This may include use of appropriate language to avoid using the words “test” and “pass”
• Assess the individual to make sure there are no reasons to postpone the test. Certain organizations may have criteria for guiding this decision. For example:
  - The presence of an acute illness may require a three-day postponement
  - Smoking of a cigarette, cigar, or pipe within the previous hour may require a one- to two-hour postponement
  - Use of any inhaled medications such as aerosolized bronchodilator within the last hour, may require a one-hour postponement
  - The individual’s last meal may make it uncomfortable for them to perform the test and may require a one- to two-hour postponement
  - The presence of an upper respiratory illness, flu, ear infections, or severe cough may require a postponement of three weeks or more after disappearance of symptoms
  - Recent surgical procedures including oral surgery may impact the ability of the person to exhale forcefully, or, in the case of oral surgery, impact the person’s ability to obtain a tight seal. The test may need to be postponed until the situation resolves.
• Make sure the individual is seated upright rather than bent over. The test can also be done in a standing position. In fact, this is the preferred position for pregnant women and obese individuals. Make sure the individual’s position is documented. If they choose to stand, make sure there is a chair available to allow them to rest
between attempts.

- Place and adjust nose clips to prevent leakage
- Instruct the individual to breathe as deeply as they can and exhale as forcefully as they can. For a COPD diagnosis, an expiratory time of at least six seconds is recommended.\textsuperscript{10} Coaching the individual throughout the maneuver during both inspiration and expiration has been shown to maximize the result.

The National Committee for Quality Assurance (NCQA) added the use of spirometry as a measure in the Healthcare Effectiveness Data and Information Set (HEDIS)\textsuperscript{TM}. The measure, Use of Spirometry Testing in the Assessment and Diagnosis of COPD, identifies the use of spirometry to confirm the diagnosis in newly diagnosed COPD patients aged 40 years and older. Data available from 2005-2008 suggests that there is substantial room for improvement (Table 2). As of July 2009, this measure is now a required measure for NCQA health plan accreditation for Commercial, Medicare, and Medicaid product lines.

<table>
<thead>
<tr>
<th>Year</th>
<th>Commercial</th>
<th>Medicare</th>
<th>Medicaid</th>
</tr>
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<tbody>
<tr>
<td>2008</td>
<td>37.6</td>
<td>27.7</td>
<td>29.3</td>
</tr>
<tr>
<td>2007</td>
<td>35.7</td>
<td>27.2</td>
<td>28.8</td>
</tr>
<tr>
<td>2006</td>
<td>36.1</td>
<td>27.2</td>
<td>27.3</td>
</tr>
<tr>
<td>2005</td>
<td>34.8</td>
<td>26.3</td>
<td>26.5</td>
</tr>
</tbody>
</table>

Another aspect of using spirometry in COPD diagnosis is bronchodilator reversibility testing. This should inform the clinician about the presence and severity of airway obstruction and its reversibility in response to a standard bronchodilator dose. Once this information is reported, the clinician can determine, in combination with the other information available, whether asthma or COPD is more likely. There is considerable overlap in the bronchodilator responsiveness of these two diseases, so that spirometry alone may not be diagnostic. However, the consistent performance and interpretation of any test is essential to maximize its value, allow comparison of results, and to ensure its sensitivity and specificity are maintained.\textsuperscript{11}

There are international guidelines for the performance and interpretation of lung-function tests.\textsuperscript{12} While respiratory laboratories
would generally aim to achieve these standards, they may be more difficult to attain in primary care. Recommendations for assessing reversibility are given in a Thoracic Society of Australia and New Zealand (TSANZ) position paper. These are similar to the American Thoracic Society (ATS) standards, which indicate that a 12% increase in forced FEV₁ over baseline and a minimum 200 mL improvement in FEV₁ or FVC constitute a positive response to bronchodilator.

ATS guidelines indicate that bronchodilator reversibility should be assessed by use of a short-acting β₂-agonist, by metered-dose inhaler (MDI). It currently is not considered appropriate to administer high doses of combination bronchodilators by nebulizer for convention reversibility testing, as it is outside current ATS guidelines for reversibility testing standardization. Optimizing delivery of a β₂-agonist using spacers is acceptable.

Once COPD is diagnosed, the severity can be assessed. Severity is based on spirometry measures and patient symptoms, and comorbid conditions can increase the severity. There are 4 severity stages and they include: I: Mild COPD; II: Moderate COPD; III: Severe COPD; and IV: Very Severe COPD. Table 3 describes the stages of COPD based on spirometry measures and symptoms. People often do not see a health care provider until stage II, though diagnosis at stage I is ideal. Chronic cough and sputum production are not normal and, combined with risk factors, need to be evaluated further for Stage I COPD.

<table>
<thead>
<tr>
<th>COPD Stages</th>
<th>FEV₁ /FVC</th>
<th>FEV₁</th>
<th>Symptoms</th>
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<tbody>
<tr>
<td>I: Mild COPD</td>
<td>&lt;0.70</td>
<td>≥80% predicted</td>
<td>Sometimes chronic cough &amp; sputum production</td>
</tr>
<tr>
<td>II: Moderate COPD</td>
<td>&lt;0.70</td>
<td>50% to &lt;80% predicted</td>
<td>Dyspnea with exertion</td>
</tr>
<tr>
<td>III: Severe COPD</td>
<td>&lt;0.70</td>
<td>30% to &lt;50% predicted</td>
<td>Greater dyspnea, reduced exercise capacity, repeated exacerbations, impact on quality of life</td>
</tr>
<tr>
<td>IV: Very Severe COPD</td>
<td>&lt;0.70</td>
<td>&lt;30% or &lt;50% predicted with chronic respiratory failure</td>
<td>Quality of life impaired, exacerbations may be life-threatening</td>
</tr>
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DIFFERENTIAL DIAGNOSIS

Though important to patient care, physical exams are rarely diagnostic for COPD. This is because the physical symptoms are usually not evident until there is significant lung impairment. See Table 4 for a list of physical findings that may assist in the diagnosis.

<table>
<thead>
<tr>
<th>Table 4. Physical Findings to Aid in COPD Diagnosis</th>
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<tr>
<td>Central cyanosis</td>
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<td>Chest wall abnormalities (barrel chest, hyperinflation, or protruding abdomen)</td>
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<tr>
<td>Flattening of the diaphragm</td>
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<tr>
<td>Increased resting respiratory rate (20+ breaths per minute)</td>
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<tr>
<td>Pursed-lip breathing, which may slow expiratory flow and permit more efficient lung emptying</td>
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<tr>
<td>Resting muscle activation while supine. Use of the scalene and sternocleidomastoid (accessory) muscles in an additional indicator of respiratory distress</td>
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<tr>
<td>Ankle or lower extremity edema can be a sign of heart failure</td>
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In addition to being underdiagnosed, COPD is often initially misdiagnosed as asthma. Table 5 compares the common features of COPD vs. asthma. These characteristics can be used by case managers to help eliminate misdiagnosis. It is important to remember that the table lists common characteristics, but they are not characteristics that occur in every case. For example, someone who has never smoked can develop COPD, and asthma can develop at any age. Use of general characteristics can lead to earlier identification and treatment, which is an important element of improved COPD management. A correct initial diagnosis means an earlier start on the appropriate path.

Although asthma is a major disease that should be differentiated from COPD, other diseases should also be differentiated such as heart failure, bronchiectasis, tuberculosis, obliterative bronchiolitis, and diffuse panbronchiolitis.
Chronic Obstructive Pulmonary Disease (COPD)

**BURDEN AND AT RISK POPULATION**

There are approximately 24 million people with impaired lung function, while about half remain undiagnosed. Age-adjusted data in the US from 1970 to 2002 show us that COPD, the fourth leading cause of death in the United States, was the only major disease to show increasing mortality rates. The number of people who smoke has decreased in the United States, but there is a lag time between the decrease in smoking rates and the decrease in COPD. The prevalence of COPD continues to increase. The mortality rate for women with COPD has steadily increased since the 1970’s and has led to a rate only slightly lower than that for men, compared to a historically much lower rate for women.¹

There are a number of risk factors for developing COPD. Case managers can use this information to identify individuals who may be in the early stages of COPD, and encourage appropriate medical evaluation. These risk factors are described below:15

- Tobacco smoke. A history of smoking is the most common risk factor for developing COPD. Usually the individual will have a 10 year pack history of smoking. Passive exposure to smoke is also a risk factor for developing COPD.

- Occupational exposures. Occupational exposure to dusts and chemicals, including hobbies, can increase the risk of developing COPD.

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**Table 5.**

<table>
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<th>Common Features in Differential Diagnosis of COPD vs. Asthma¹¹⁴</th>
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<tbody>
<tr>
<td><strong>COPD</strong></td>
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<tr>
<td>Onset mid-life (40 years)</td>
</tr>
<tr>
<td>Symptoms progressive</td>
</tr>
<tr>
<td>Long history of tobacco smoking, usually ≥10 pack year history</td>
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<tr>
<td>Persistent or worsening dyspnea, initially during exercise, eventually at rest</td>
</tr>
<tr>
<td>Cough may be intermittent, but is later present every day, often throughout the day</td>
</tr>
<tr>
<td>Partially irreversible airflow limitation</td>
</tr>
<tr>
<td>Inflammatory cells, primarily neutrophils</td>
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</table>
• Indoor and outdoor air pollution. Areas with increased air pollution, either outdoors or indoors can increase the risk of developing COPD.

• Low socioeconomic status. Lower socioeconomic status is often associated with smoking, working in occupations with potential exposures, and air pollution.

• Genetic factors. Alpha-1 Antitrypsin Deficiency is a hereditary deficiency. This deficiency increases a person’s risk of developing early onset emphysema without smoking or smoking very little. Other genetic factors may exist and are being researched.

• Other respiratory disorders. Asthma, airway hyper responsiveness, severe respiratory infections in childhood, and decreased lung growth in childhood also increase the risk of developing COPD.

These risk factors, especially a history of smoking, when seen with a history of a cough and sputum production, should lead a health care provider to spirometry testing to diagnose COPD. Since there are an estimated 12 million individuals who have evidence of the disease, but are not diagnosed, it is important to identify an effective method of population screening.

In an effort to identify individuals who may be at risk for COPD, case managers can use the **COPD Population Screener™ (COPD-PS™)**. It is an easy-to-use, validated tool designed to help identify those aged 35 and older at-risk for COPD (developed by Boehringer Ingelheim and QualityMetric Incorporated, the tool is included in the resources section). The five question screener can help the case manager implement a screening process to identify individuals that may have undiagnosed COPD. The tool was validated in a population of individuals age 35 and older. Experience with the tool has shown that in 88% of the cases, COPD was correctly classified. Of course, diagnosis should be confirmed with spirometry. The screener can also be obtained at www.copd screener.com. It is included here with permission. See Appendix 3.

**PREVALENT TREATMENT MODALITIES**

Once COPD is diagnosed, the GOLD Guidelines identify specific treatment goals. These include:

- Relieve symptoms
- Prevent disease progression
- Improve exercise tolerance
- Improve health status
• Prevent and treat complications
• Prevent and treat exacerbations
• Reduce mortality

These goals can be achieved through the implementation of a COPD Management program with four components:
• Assess and monitor disease,
• Reduce risk factors,
• Manage stable COPD, and
• Control exacerbations.

Each component will be discussed in more detail.

COMPONENT #1: ASSESS AND MONITOR DISEASE

Assessment was discussed previously in the signs and symptoms and the diagnosis sections. Part of the case manager’s role in managing the individual with COPD is ongoing assessment and monitoring. In addition to those previously described, there are tools available to allow for continuing characterization of the individual’s disease. Some of the assessment tools are not appropriate for a busy primary care setting, and possibly for case managers, but their discussion here demonstrates some of the complexities of ongoing assessment and monitoring of COPD.

Bailey et al describe the development of the COPD Assessment Questionnaire (COPD AQ). Their goal was to spur improvement in COPD care similar to that seen in asthma with the development of the Asthma Control Test (ACT). The researchers incorporated published information from patients and physicians, and reviewed existing questionnaires such as the Seattle Obstructive Lung Disease Questionnaire, Clinical COPD Questionnaire, St George’s Respiratory Disease Questionnaire, and the Airways Questionnaire. Based on limitations with study methodology and definitions, the investigators stopped development of the tool. Instead they are actively developing and validating a tool known as CAT (COPD Assessment Tool) that will build on the strengths of the COPD-AQ.

While the quest continues for the definitive assessment tool, monitoring and assessment of COPD must be accomplished with the available resources. What are the most effective ways for case managers to assess and monitor COPD? One effective method is to elicit the involvement of the person with COPD. Not only does this serve to educate the individual about the important components of self-management, it encourages self-monitoring and provides a potential opportunity to prevent exacerbations.
Monitoring activities for individuals with COPD includes the use of a symptom diary. The case manager can use the symptom diary to familiarize the person with common COPD symptoms and use this discussion later to introduce the person to the early recognition of exacerbations and instruct them on the appropriate actions to take if they should experience an exacerbation. The symptom journal should include prompts for recording dyspnea, cough, sputum, wheezing, chest discomfort, weight loss, and signs of depression. The amount of detail included and the frequency of requested record keeping should be geared towards the individual’s knowledge and motivation. The CMAG Guidelines can assist the case manager in determining the person’s knowledge and motivational levels. The tools and process for making this determination are described in this chapter as well as in the CMAG Tools and Resources Manual available at www.cmsa.org. However, in general, simplicity will increase use of any resource by individuals in a case manager's case load.

In addition to symptoms, the case manager should educate regarding common irritants or events that may cause the person’s symptoms to worsen. Situations such as respiratory infections, exercise, weather changes, indoor and outdoor pollution, exposure to cigarette or other smoke, exposure to allergens, chemicals or irritants encountered at work or in hobbies, stress and/or anxiety, etc. As with symptoms, review of these common triggers serves multiple purposes. First, the most immediate reason is the obvious recording of situations that result in actual or potential exacerbations. Second, it provides the opportunity to discuss the correlation between activities, behaviors, and situations that affect the person's COPD and the mechanism by which it occurs. This will aid the person in understanding how behavior impacts their disease, and which behaviors have the most adverse consequences on their health. The case manager can use these moments of realization as sessions to explore ideas for reducing or eliminating these situations or behaviors.

Some individuals will be more receptive to the symptom journal than others. Regardless of whether the person maintains a symptom journal or not, there are assessment questions that should be a part of the case manager’s ongoing involvement with the individual diagnosed with COPD. The following list of questions from the GOLD Guidelines provide a comprehensive and consistent list of questions for each contact:¹
Monitor exposure to risk factors:
• Has your exposure to risk factors changed since your last visit?
• Since your last visit, have you quit smoking, or are you still smoking?
• If you are still smoking, how many cigarettes/how much tobacco per day?
• Would you like to quit smoking?
• Has there been any change in your working environment?

Monitor disease progression and development of complications:
• How much can you do before you get short of breath? (Use an everyday example, such as walking up flights of stairs, up a hill, or on flat ground.)
• Has your breathlessness worsened, improved, or stayed the same since your last visit?
• Have you had to reduce your activities because of your breathing or any other symptom?
• Have any of your symptoms worsened since your last visit?
• Have you experienced any new symptoms since your last visit?
• Has your sleep been disrupted by breathlessness or other chest symptoms?
• Since your last visit, have you missed any work/had to see a doctor because of your symptoms?

Monitor pharmacotherapy and other medical treatment:
• What medicines are you taking?
• How often do you take each medicine?
• How much do you take each time?
• Have you missed or stopped taking any regular doses of your medicine for any reason?
• Have you had trouble filling your prescriptions (e.g., for financial reasons, not on formulary)?
• Please show me how you use your inhaler.
• Have you tried any other medicines or remedies?
• Has your treatment been effective in controlling your symptoms?
• Has your treatment caused you any problems?

Monitor exacerbation history:
• Since your last visit, have you had any episodes/times when your symptoms were a lot worse than usual?
• If so, how long did the episode(s) last? What do you think caused the symptoms to get worse? What did you do to control the symptoms?

In monitoring exacerbation history, it is important to get information on those that were self-managed and those that were managed by health care providers. If the person is vague with regard to describing exacerbations, it can be useful to use surrogate markers. For example, ask if they had any unplanned doctor visits, increased use of bronchodilators, or had the addition of an antibiotic. Not only do these questions provide valuable information on potential exacerbations, they provide an opportunity to educate about signs and symptoms of exacerbations and monitoring their conditions.

**COMPONENT #2: REDUCE RISK FACTORS**

“Smoking cessation is the single most effective- and cost effective-intervention in most people to reduce the risk of developing COPD and stop its progression.”

Case management information regarding smoking cessation will be addressed in depth later in the chapter under Adherence Challenges.

Active identification and elimination of risk factor exposure is important at all stages of COPD, especially at earlier stages to decrease the progression of COPD. Tobacco smoke is the most common risk factor, including passive smoke exposure. Occupational exposure is an underappreciated risk factor. The NHANES III survey indicated that occupational exposure may account for up to 19% of COPD in smokers and up to 31% of COPD in nonsmokers.

Many occupations are at higher risks. It is not possible to quantify all of the potential occupations that could pose a risk. Even when risk is a concern and measures are instituted, it is difficult to know the longer term affects. Concerns over cocktail waitresses and others in jobs that expose them to a large amount of cigarette smoke are still not fully addressed. Many states still allow smoking in these environments without apparent recognition of this common and controllable occupational exposure. A risk factor identified earlier is socioeconomic status. Low socioeconomic status can be a cause of increased exposure to both occupational and environmental contaminants. Individuals in this category may have occupations with higher risk or older and poorly-maintained housing.

Air quality issues are a concern in many major cities and even in some rural communities. Individuals should monitor media outlets that
broadcast information on air quality and heed the recommendations. As a case manager, consider all risk factors and steps to eliminate or minimize exposure to environmental risks.

People with all stages of COPD can benefit from all Centers for Disease Control and Prevention (CDC) recommended immunizations including the annual seasonal influenza vaccine, pneumococcal vaccine, and other vaccines that may be recommended as a result of an outbreak or risk of outbreak such as H1N1 in 2009-2010.

**COMPONENT #3: MANAGE STABLE COPD**

While COPD is a gradually progressive, serious disease, periods of relative stability may breed complacency in both the individual with COPD and the individual’s provider. This is a great opportunity to apply the CMAG guidelines to determine where the individual ranks in knowledge and motivation toward self-care and self-management, and a great opportunity to identify gaps in care. It is important to review each of the symptoms and the appropriate management strategies with the individual.

From a CMAG perspective, knowledge is one of the three ingredients in lasting behavior change. The other two, motivation and behavioral skills, can be improved by knowledge. With COPD it is important that individuals understand the nature of the disease, risk factors for progression, and their role and the role of the health care professionals in achieving optimal management and health outcomes.1

All education should be tailored for the individual. Part of this tailoring includes assessing the person's health literacy. The CMAG tool, the REALM-R, can help to identify potential issues with health literacy. Make sure to pay special attention to potential health literacy issues, and keep in mind that 2 out of 5 adults have difficulty obtaining, processing, and understanding the basic health information and services necessary to make appropriate health care decisions.19 An additional tool for measuring health literacy is the TOFHLA: Test of Functional Health Literacy in Adults. It is used to test reading comprehension and numerical skills. It takes 20-25 minutes to administer and is available in Spanish and English.20 Figure 1 summarizes the Treatment Modalities for Each Stage of COPD.
KEY MANAGEMENT SKILLS:

Medication Management

Medications are used to:
- Prevent and control symptoms,
- Reduce the frequency and severity of exacerbations,
- Improve health status, and
- Improve exercise tolerance.

Inhaled medications are often used to manage COPD. These tend to have fewer side effects and work more directly on the lungs. Long-term control medications are prescribed in Stage II-Stage IV COPD. These medications are taken daily to optimize lung function. Quick-relief medications are taken as needed to improve shortness of breath. An important self-management step is mastering the use of the metered dose inhaler (MDI).

Correct MDI technique can be difficult, especially for elderly patients. The use of a holding chamber with an MDI improves delivery of the medication to the lungs. The holding chamber should be anti-static for...
use with the newer (Hydrofluoroalkane) HFA propellants, and should also have a one-way valve. This is helpful if the person has difficulty coordinating actuation of the MDI with inhalation, which is a common problem with the elderly.

“Nebulizers are not recommended for regular treatment because they are more expensive and require appropriate maintenance.” Nebulizers require specific cleaning and drying after each use, which is labor intensive. Nebulizers not cleaned and dried correctly can lead to respiratory infections.

Whichever device the person uses, remember to check inhalation technique at every visit. The following techniques should be reviewed depending upon the type of device used. Each inhalation device requires a specific technique to inhale the medication effectively. It is recommended to check the pharmaceutical manufacture’s product insert to ensure proper inhaler technique based on the delivery device. Whichever device a person uses, they should know:

- How to use the device,
- How to clean the device, and
- How to identify when the device is empty.

**Steps for Using an MDI**

1. Remove the cap from the inhaler.
2. Hold the inhaler with the mouthpiece at the bottom.
3. If required for proper use, shake the inhaler as directed by the product labeling. This mixes the medication properly.
4. Open Mouth Technique - Hold the mouthpiece 1 1/2 - 2 inches (2 - 3 finger widths) in front of your mouth. Close Mouth Technique - Seal your lips tightly around the inhaler mouthpiece.
5. Tilt your head back slightly and open your mouth wide.
7. Press the inhaler and at the same time begin a slow, deep breath. Continue to breathe in slowly and deeply over 3 - 5 seconds. Breathing slowly delivers the medication deeply into the airways.
8. Hold your breath for up to ten seconds. This allows the medication time to deposit in the airways.
9. Resume normal breathing.
10. Repeat steps 3 - 9 when more than one puff is prescribed.

Clean the plastic case and cap by rinsing thoroughly with warm water, weekly.
Using a MDI with a holding chamber:

Since there are numerous types of holding chambers, the individual should read the instructions that come with their holding chamber. However, there are some general instructions:

1. Remove the cap from the MDI
2. Hold the MDI Upright and place mouth piece into the holding chamber
3. If required for proper use, shake the MDI and chamber 3-5 times, or as directed by product labeling.
4. Hold your head tilted slightly backward and breath out
5. Put your mouth around the holding chamber
6. Squeeze down on the MDI to release the medication into the holding chamber
7. Breathe in slowly and completely for 3-5 seconds
8. Hold your breath about 10 seconds
9. Repeat as instructed waiting about one minute between inhalations.

Inhaled Medication with a Dry Powder Inhaler

Several medicines for COPD are now delivered in a dry powder inhaler (DPI). Since the medicines are dry powder, they must be delivered in a special inhaler. When you inhale fast enough, the medicine is released.

The basic technique for using a dry powdered medication is:

1. Insert the medication capsule into the device as instructed with product labeling.
2. Exhale away from device
3. Put mouthpiece in your mouth
4. Breathe in quickly

Medications Used in COPD Management

Bronchodilators are central to the symptomatic management of COPD. Bronchodilator medications work by relaxing smooth muscles around the airways in the lungs. There are a number of bronchodilators that are used to manage COPD. Bronchodilators can increase FEV$_1$, reduce hyperinflation during rest and exercise, and improve exercise performance. Classes of bronchodilators include:
• Short-acting $\beta_2$-agonists and anticholinergics are recommended for every stage of COPD. They are recommended for symptomatic relief to be taken either routinely or as-needed to improve shortness of breath. They also may be prescribed as a pre-treatment before exercise. These are provided as MDIs. There are also short-acting combination medications that include a $\beta_2$-agonist and anticholinergic.

• Long-acting $\beta_2$-agonists and anticholinergic bronchodilators are considered more effective and convenient. The guidelines generally recommend these agents for Stage II-IV COPD.

• Methylxanthines (e.g., theophylline) play a limited role in contemporary COPD management due to their potential toxicity, including arrhythmias and seizures. Inhaled bronchodilators are generally preferred.

Inhaled glucocorticosteroids are used in addition to bronchodilators for repeated exacerbations and generally only for stages III-IV disease. Most studies show that they do not modify the long term FEV$_1$ decline in COPD patients nor do they reduce overall mortality. However, regular use can reduce exacerbation frequency and improve health status in patients with late stage COPD where the FEV$_1$ levels are $<50%$.¹

• Note: Rinsing the mouth with water after inhaling the corticosteroid and using a holding chamber with a metered-dose-inhaler is recommended to prevent thrush.

The guidelines recommend combination long-acting $\beta_2$-agonists/inhaled corticosteroids for COPD stages III-IV. The combination is more effective than the individual components in reducing exacerbations and improving lung function and health status. The combination further increases adherence by simplifying the medication routine if both medications are prescribed.

**Drug Actions and Adverse Results:**

$\beta_2$-Agonist (short and long acting)²²

Action: $\beta_2$-agonists primarily relax airway smooth muscle by stimulating $\beta_2$-adrenergic receptors. This, in turn, increases cyclic adenosine monophosphate (AMP) and produces a functional antagonism to bronchoconstriction.

Adverse Reactions: The most common side effects are more frequent in oral therapy than in inhaled therapy. They include palpitations and premature ventricular contractions, tremor, and sleep disturbance.
Anticholinergic Agents

Action: The key mechanism of anticholinergic medications appears to be the blocking of muscarinic receptors (M1, M2, M3). Muscarinic receptors are associated mainly with parasympathetic functions and are located in peripheral tissues (e.g., glands and smooth muscle). By blocking acetylcholine-mediated bronchoconstriction, the end result is bronchodilation.

Adverse Reactions: Side effects with the anticholinergic therapy includes dry mouth, glaucoma, and urinary retention.

Corticosteroids

Action: Corticosteroids closely resemble cortisol, a hormone naturally produced by the body’s adrenal glands, and produce an anti-inflammatory effect that decreases inflammation in the airway. This reduces swelling and mucous production and makes breathing easier. Adverse Reactions: In the inhaled form, the person may develop thrush and hoarseness (rinsing the mouth after use can help prevent this). Corticosteroids can also place adults at increased risk of osteoporosis. Individuals receiving corticosteroids are also at an increased risk of pneumonia. Cataracts and glaucoma can be a risk in the elderly. Finally, Cushing’s syndrome is a rare side effect.

Methylxanthines

Action: Act primarily as nonselective phosphodiesterase inhibitors, but have also been reported to have a range of non-bronchodilator actions.

Adverse Reactions: Due to its potential toxicity and serious side effects, careful dose management is essential. Side effects include ventricular and atrial rhythm disturbances and convulsions.

Antibiotics

Randomized controlled studies of exacerbations in COPD show antibiotics can have a beneficial effect on lung functions. The use of antibiotics will be discussed in more depth during the discussion of exacerbation management.
Oxygen Therapy

Individuals should be educated about many different aspects of oxygen including:

- why it is needed
- how they know they need it,
- how much to use,
- how long to use it,
- oxygen requirements for sleep,
- types of delivery systems,
- oxygen system maintenance,
- equipment and supplies needed,
- costs, and
- insurance coverage.

Safety issues are another concern. The person should be educated about adverse effects, and what to do if they occur. In some cases too much oxygen may lead to an increase of carbon dioxide in the blood. This can cause symptoms such as drowsiness and difficulty keeping awake. Receiving too much oxygen while sleeping can also result in a morning headache. A sign of receiving too little oxygen is a general feeling of fatigue. If any of these problems occur, the individual should contact their healthcare provider.23

Oxygen used properly is safe. Advise persons using oxygen - DO NOT SMOKE NEAR OXYGEN! Also, stay away from open flames. It is important that no oil or grease is used on any of the oxygen equipment. Oxygen cylinders should be secured and placed in an area where they will not fall. Cylinders are under high pressure and a crack in the cylinder can be lethal. Individuals need a reminder to turn off all equipment when not in use. Oxygen containers should not be stored near water heaters, furnaces, or other sources of heat or flame. Oxygen containers and the storage room should be properly marked/labeled. There should be good ventilation around oxygen equipment. The oxygen supplier should provide people with a complete list of instructions and safety precautions.23

Long-term oxygen therapy (LTOT) is prescribed for Stage IV - Very Severe COPD. LTOT is prescribed when people have:1

- $\text{SaO}_2$ at or below 88% or $\text{PaO}_2$ at or below 7.3 kPa (kilopascal) (55 mm Hg) or
• SaO₂ at or below 88% or PaO₂ at or below 7.3 kPa (55 mm Hg) and 8.0 kPa (60 mm Hg) if there is evidence of pulmonary hypertension, peripheral edema suggesting heart failure, or polycythemia

LTOT in the presence of chronic respiratory failure increases survival. In addition, LTOT improves mental alertness, physical conditioning, and psychological state.

Oxygen is prescribed by liter flow. The liter flow is prescribed for rest, activity, and sleep. Often a person requires more oxygen during activity and sleep than at rest.

When oxygen is prescribed, there is a large stationary unit often used in the home. Portable systems are also prescribed to increase a person’s activity level, but tend to weigh more than 10 lbs. Ambulatory systems can also increase a person’s activity level, but tend to weigh less than 10 lbs.

Oxygen is available in three different systems, compressed gas, concentrators, and liquid. The advantages and disadvantages of each will be discussed:

• Compressed gas - Oxygen gas is compressed in an aluminum cylinder. Compressed gas is available in many areas of the country and internationally. A large H tank is the stationary unit for the home, an E tank is a portable system, and the smaller M6 tank (about the size of a wine bottle) is an ambulatory system. Compressed gas may be more bulky than some of the other portable systems. The regulator needs to be changed when the tank is empty. The oxygen supply company must visit routinely to fill the units.

• Concentrators - Concentrators take oxygen from the room air and concentrate it. Stationary concentrators require electricity and plug into the wall. Concentrators allow the person using the oxygen to be more independent. The oxygen supply company often doesn’t need to visit as often as with other systems. Concentrators can be noisy and create extra heat. A separate portable system is required when away from home and in case of a power outage.
  - There are concentrators now that can fill a portable unit, although this takes longer than with a liquid system.
  - Portable concentrators have recently been developed. These are small concentrators, between 10 and 20 lbs (approximately) that may be battery operated, used with a DC adaptor, or used with electricity. Most of the portable concentrators use an on-demand oxygen, although several models also work with continuous flow.
• Liquid - Oxygen is liquefied at cold temperatures and placed in the stationary unit. There is a stationary liquid system for the home. Portable and ambulatory units can be filled from the stationary unit quickly and easily. The oxygen supply company must visit routinely to fill the stationary system. Liquid oxygen is more expensive than other systems and less available throughout the United States. The liquefied oxygen takes up less space than the gas, so smaller portable and ambulatory units are available.

**Continuous Flow Systems and On-Demand Systems**

Continuous flow systems release oxygen continuously. On-demand systems release oxygen when the person inhales. This can conserve oxygen allowing the portable and ambulatory units to last longer. There are a number of on-demand systems that help conserve oxygen in the portable and ambulatory units. On-demand units are available for use with each of the three systems.

Some people are able to use an on-demand system to correct hypoxemia. Other people are not able to and require a continuous flow system. Pulse oximetry should be monitored during rest and activity using the on-demand system to make sure hypoxemia is corrected. The nasal canula delivers oxygen to the person. There are different types of nasal canula’s available. If one type is not comfortable another type may be a better fit.

**High Flow Oxygen**

If a person requires high liter flow oxygen there are a number of options to consider:

• High liter flow oxygen nasal canulas and tubing are available. They can be used when 6-12 liters of oxygen is required.

• Transtracheal oxygen. A small canula is placed from the neck into the trachea. The canula is changed routinely by the patient or a caregiver. The oxygen requirement can be decreased significantly because oxygen is delivered more efficiently.

**Traveling with Oxygen**

Case managers should be familiar with how to travel with oxygen. This includes a reviewing with individuals points to consider when traveling:

1. **Is the destination suitable?**
   Choose areas of similar elevation to home. Areas of higher elevation have less oxygen in the air. It is also a good idea to avoid
driving through areas of high elevation if you are going by bus, train, or car.

2. **Will you tolerate the climate?**
   High humidity and extreme temperatures (very hot or very cold) can make breathing more difficult.

3. **Is air pollution a problem where you are going?**
   Many cities have high levels of air pollution that can make symptoms like cough, wheezing, and shortness of breath much worse. It is best to choose a location with clean air.

4. **Do you have seasonal allergies?**
   If so, travel during the season your allergies give you the least trouble.

If you can’t get one of the newer portable oxygen concentrators (POC), you will need to make sure you have a source of oxygen arranged for the entire length of travel.

**Air Travel with Oxygen**

Traveling by air requires careful planning. Although air travel is safe for most patients with chronic respiratory failure who are on LTOT, patients should be instructed to increase the flow by 1-2 L/min during the flight. Each airline has its own policies regarding oxygen. Individuals must carry the oxygen prescription with them at all times. Many of the airlines have their own airline-specific medical form for the doctor to fill out and it is generally valid for one year. A helpful tip: tell patients to keep their other medications, prescriptions, and forms with them while traveling and not in checked baggage. The FAA (Federal Aviation Administration) has several approved POCs for air travel. These can be carried on the plane and stored under the seat during use. They can be battery powered when not plugged into an outlet. Individuals are not allowed to carry any other personal systems on board and oxygen tanks cannot be checked as baggage on any airline. Individuals should probably check with their insurance carrier to make sure to arrange for oxygen upon arrival at their destination.

**Automobile Travel with Oxygen**

As with air travel, make sure the individual checks on necessary arrangements for oxygen at their destination location. If their car is
large enough, they can transport their concentrator and use tanks when they don’t have a power supply. Care should be taken when traveling with oxygen. Tanks should be stored out of direct sunlight and heat and should never be left in a hot car. No one should smoke in the car.24

The car used for travel should be in good working order and the route should be arranged in advance. If staying in a hotel, reservations should be made and the hotel notified that oxygen will be in use in the room.24

Pulmonary Rehabilitation

Pulmonary rehabilitation is “an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory disease who are symptomatic and often have decreased daily life activities.”26 Pulmonary rehabilitation is recommended for Stage II - Stage IV COPD, although people with Stage I COPD can benefit from pulmonary rehabilitation also. The GOLD Guidelines identify the following proven benefits of pulmonary rehabilitation:1

• Increased exercise capacity,
• Reduced dyspnea,
• Improved health-related quality of life, and
• Decreased healthcare utilization.

The goals of pulmonary rehabilitation include:

• Reduce symptoms,
• Improve quality of life, and
• Increase physical and emotional participation in everyday activities.

A comprehensive pulmonary rehabilitation program includes exercise training, nutrition counseling, psychosocial counseling, and self-management education. Each will be discussed below in more detail.

Exercise Training

As stated earlier, as people with COPD develop increasing breathlessness, they may feel “out of shape.” They may decrease physical activity to prevent breathlessness, which in turn becomes a vicious cycle of deconditioning and breathlessness. Exercise training can turn this cycle around. Exercise training is individualized for each person, but often involves endurance training, strength training, pursed-lip breathing, and controlled breathing with exercise.

Pursed-lip breathing is a breathing technique to help keep the airways
open, slow down the breathing rate and calm the person down. The steps for pursed-lip breathing include:27,28

- Inhaling slowly through the nose with the mouth closed.
- Exhaling slowly through the mouth with the lips in a whistling or kissing position.
- Breathing out is twice as long as breathing in.

Controlled breathing is important to provide adequate oxygenation with exercise. Controlled breathing with exercise includes:28

- Inhaling through the nose before starting the exercise or activity.
- Exhaling through the mouth through pursed lips, during the most exerting part of the exercise or activity.

**Nutrition Counseling**

Twenty-five percent of people with stage II-IV COPD are underweight. Underweight people with COPD have an increased risk of mortality. Obesity can also impact individuals with COPD. In individuals without COPD, obesity makes the work of breathing more difficult, so those with COPD are additionally burdened. In addition, obesity complicates and or eliminates some treatments for COPD such as noninvasive mechanical ventilation and surgical interventions. Nutrition counseling can help identify appropriate nutrition strategies.

**Psychosocial Counseling**

Depression and anxiety are common in COPD and can affect adherence. Psychosocial counseling that addresses each issue and identifies social support can be very helpful.

**Patient Education**

Patient education is incorporated into all aspects of COPD management. Specific topics for patient education may be stressed with the patient based on the stage of COPD. Table 6 identifies topics for patient education based on the stage of COPD.

Self-management strategies are more effective than didactic strategies. Self-management strategies instruct the person in the skills and knowledge required to manage their disease working with the health care provider. This involves open and ongoing communication between the health care provider and person with COPD. The case manager can play an important role in developing this active partnership.
Chronic Obstructive Pulmonary Disease (COPD)

Surgical Procedures

A number of surgical procedures may be considered in a select group of people with COPD. These include: bullectomy, lung volume reduction surgery, and lung transplant.

Lung Volume Reduction Surgery (LVRS)

This is a surgical procedure where parts of the lungs are resected to reduce hyperinflation, making the lungs more effective pressure generators by improving their mechanical efficiency. In addition, LVRS increases the elastic recoil pressure of the lung and thus improves expiratory flow rates. Clinical studies have shown increased survival rates in people with upper lobe emphysema and low exercise tolerance who had surgery when compared to similar patients who received medical therapy (54% vs. 39.7%). The results are less significant in people with involvement in other areas of the lung and high exercise tolerance. Although there have been some positive results, this remains a palliative and expensive intervention that should be used in only a select group.1

Lung Transplantation

In appropriately selected patients with very advanced COPD, lung transplantation has been shown to improve quality of life and functional capacity. There are several limitations to lung transplantation. First, there is a shortage of donor organs. Second, there are numerous complications including rejection, infection, and bronchiolitis.
obliterans. Finally, cost is a limiting factor. Costs can range from $110K to $200K and usually remain elevated for months and years following transplant.¹

**COMPONENT #4: MANAGE EXACERBATIONS**

“An exacerbation of COPD is defined as an event in the natural course of the disease characterized by a change in the patient's baseline dyspnea, cough, and/or sputum that is beyond normal day-to-day variations, is acute in onset, and may warrant a change in regular medication in a patient with underlying COPD.”¹

Exacerbations may be managed at home or in the hospital setting depending on the severity of symptoms. This is not to imply that the patient should identify or attempt to treat an exacerbation independently. Patients should always be encouraged to see a physician on a regular basis, and to contact them at the first sign of any symptoms worsening.

Symptom distress is strongly correlated with impaired quality of life. Individuals with COPD showed a strong association with symptom distress, sickness-related dysfunction, and lower levels of psychological well-being. Individuals with advanced COPD have multiple distressing symptoms and a high prevalence of mood disturbance. Any of these factors can complicate the individual’s ability to manage their exacerbations. Research suggests that assisting individuals in reducing symptoms and psychological distress may lead to an overall improvement in quality of life. A key focus of the case manager, physician, and other health care team members is supporting the individual in symptom control and reducing associated psychological distress.

Case managers have a key role in preventing exacerbations. Part of the role includes careful monitoring. As described earlier, self-management is an important component of exacerbation management. Case managers should prepare individuals to recognize symptoms early and act quickly to treat. The sections on adherence challenges and successful discharge will highlight case management interventions to help people with COPD reduce their exacerbations.

**Managing Exacerbations at Home**

An individual with COPD should know how to identify worsening symptoms. Symptoms of an exacerbation may include: increased breathlessness, wheezing, chest tightness, increased cough and
sputum, change in sputum color and thickness, and fever. In addition, general symptoms may include: fatigue, insomnia, sleepiness, depression, confusion, and decreased exercise tolerance. Identifying symptoms early and taking action is important to prevent symptom progression. Once worsening symptoms are identified, a COPD action plan provided by your physician offers guidance for the person with COPD. The plan often includes information about adjusting medications based on symptoms and when to contact the health care provider. See the COPD Action Plan and Check-List in the Appendix.

Managing Exacerbations in the Hospital

Once a person arrives in the hospital setting, the symptom severity should be assessed. Table 7 summarizes management of severe symptoms in the hospital setting.

<table>
<thead>
<tr>
<th>Table 7. Management of Severe but Not Life-Threatening Exacerbations of COPD in the Emergency Department or the Hospital</th>
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<tbody>
<tr>
<td>• Assess severity of symptoms, blood gases, chest X-ray</td>
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<tr>
<td>• Administer controlled oxygen therapy and repeat arterial blood gas measurement after 30-60 minutes</td>
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<tr>
<td>• Bronchodilators:</td>
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<tr>
<td>- Increase doses and/or frequency</td>
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<tr>
<td>- Combine β2-agonists and anticholinergics</td>
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<tr>
<td>- Use spacers or air-driven nebulizers</td>
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<tr>
<td>- Consider adding intravenous methylxanthines, if needed</td>
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<tr>
<td>• Add oral or intravenous glucocorticosteroids</td>
</tr>
<tr>
<td>• Consider antibiotics (oral or occasionally intravenous) when signs of bacterial infection</td>
</tr>
<tr>
<td>• Consider noninvasive mechanical ventilation</td>
</tr>
<tr>
<td>• At all times:</td>
</tr>
<tr>
<td>- Monitor fluid balance and nutrition</td>
</tr>
<tr>
<td>- Consider subcutaneous heparin</td>
</tr>
<tr>
<td>- Identify and treat associated conditions (e.g., heart failure, arrhythmias)</td>
</tr>
<tr>
<td>- Closely monitor condition of the patient</td>
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</table>
Schembri et al. reports development of a tool that can estimate the risk of hospitalization and death in individuals with COPD. They use increasing age, low BMI, increased dyspnea, decreased FEV₁, and prior respiratory or cardiac hospitalization as predictors of poor outcome. Interestingly, influenza vaccination, but not pneumococcal vaccination was protective against death or hospitalization. The hope for this research and use of this tool is to guide health care professionals to timely interventions that could possibly improve outcomes. Thus ensuring individuals with COPD are vaccinated for influenza, provided with information about smoking cessation, which is the only known intervention proven to slow the rate of decline in FEV₁, and given increased attention to appropriate caloric intake are measures that can be undertaken in individuals with higher risk profiles.

The outcome of any hospitalization for a COPD exacerbation is unfavorable. Tsimogianni and colleagues looked at factors that predicted length of stay in individuals with COPD exacerbations, and looked at the 3 year mortality rates after hospitalization. As in the Schembri study, BMI and the Medical Research Council’s chronic dyspnea scale proved to have predictive value in determining outcomes in individual's with COPD exacerbations.

**ADHERENCE CHALLENGES**

When using the Case Management Adherence Guidelines (CMAG) for COPD, it is important to understand the use of the various CMAG Tools and the CMAG Algorithm. The Case Management Adherence Guidelines were developed to bring awareness to medication adherence issues and offer tools to assess and intervene with the patient. CMAG was first written with case managers in mind but the popularity of the guidelines extends much further into the healthcare professional world. In addition, the guidelines transcend medication adherence and are useful to assess and improve adherence to any aspect of the treatment plan.

In CMAG, medication/treatment knowledge and health literacy are assessed, placing the individual in a category of high or low, knowledge. Motivation with a readiness ruler and a functional support questionnaire are assessed next. At this point the individual is categorized with knowledge high or low and motivation high or low which places them in a four-quadrant system of tools and interventions. The healthcare professional facilitates improvement in adherence intention and therefore movement into higher quadrants and additional interventions customized for the individual. Involvement in care and patient behavior change are priority interventions.
Quadrant One is a “Low” Adherence Intention. This means the patient has low knowledge and low motivation. Case management interventions need to be geared toward both increasing motivation and knowledge. The first step in increasing motivation may be increasing knowledge. In order for a person to be motivated to change, they need to know what the risks are, feel vulnerable to the risks, and believe that the activities will reduce or eliminate the risks.

Even if the patient is aware of the existence of one or more risk factors or symptoms, they may not understand that poor symptom control further increases their risk. Once a patient is informed of and recognizes the risk, they have to know what they can do to reduce or eliminate the risk. The need for education and motivation typify the quadrant one patient.

Quadrant Two is a patient with a “Variable” Adherence Intention. They have a high level of motivation, but a low level of knowledge. Strategies should focus on education and increasing knowledge. This may be a person who has recognized that they have a risk, are motivated to change, but are not aware of the proper actions to implement. Many individuals are not familiar with the various aspects of COPD self-management. They don’t understand the disease, the symptoms and what causes them to occur or worsen, or what they
need to do to reduce symptoms. As part of the motivational assessment, the case manager should help identify and clarify the patient's motivation in the event the patient has future challenges with adherence.

**Quadrant Three** is also a patient with “Variable” Adherence Intention. Unlike the Quadrant Two patient, this patient is well-informed and educated regarding the risks of their behavior and the actions necessary. They are just not willing or ready for the health behavior change. Patients in quadrant three are a significant challenge. Their knowledge likely means they have already considered and rejected the more common motivations. Sufficient time has been devoted to considering their motivations and creating justifications for not changing.

**Quadrant Four** patients have a “high” Adherence Intention. They are motivated and educated. Patients in this quadrant need support with identifying situations that may lead to relapse or regression to old behaviors. Assisting the patient to develop alternative coping behaviors can prevent relapse in high stress situations. Some patients find that a change in lifestyle can lead to relapse. For example, they use their medication at the same time every day, but their child has to be transported to a team practice at that time. The person is unable to adjust their schedule with this added responsibility and adherence to medications declines.

*Some Notes on Assigning the Adherence Intention Quadrant (AIQ)*

The case manager uses the CMAG tools to identify the Adherence Intention Quadrant for the individual. It is important to note that people may be in different quadrants for different aspects of their treatment plans. For example, the person may understand the need to take their medications and be very motivated to do so (AIQ4), but they may understand the detrimental effects of smoking without being motivated to quit (AIQ3). The case manager would need to focus interventions differently for each of these components of the treatment plan.

**CASE MANAGEMENT FOCUS FOR PEOPLE WITH COPD**

**Elderly People with COPD**

Most people diagnosed with COPD are ages 40-65 years old. However, there are still many people with COPD who are elderly. In addition to the challenges faced with many of the COPD treatments, there are a number of treatment issues to consider with the elderly.
Elderly people may have vision problems, making it difficult to read instructions in small print. This will require the case manager to identify options for finding materials for this population. There are numerous resources for obtaining information suited for use in the elderly.

Elderly people may also have memory problems, arthritis, and decreased eye-hand coordination. This may make it difficult for them to properly administer inhaled treatments. The case manager will need to carefully evaluate the person’s ability to complete each phase of the required treatment. This may require accommodation in the type of device used, or even the need for the person to have regular assistance with their treatment plan.

Elderly people may have a number of comorbid conditions, complicating the treatment plan. Each condition may have an impact on the person’s treatment. For example, certain medications may be contraindicated or may magnify symptoms. The case manager will need to consider the person’s entire health picture to assist them with management of their COPD.

Smoking cessation should be recommended at all stages of COPD including the elderly. For more details, see the section on smoking cessation.

People with COPD in the Work Place

While much of the information in this chapter is relevant to both the elderly and the people with COPD in the workplace, there are some additional considerations for people working with a chronic illness such as COPD. One issue is absenteeism. Most work settings have an expectation that the individual will be at work and able to work. Some employers have policies that address absences as a performance issue that may jeopardize an individual’s employment status. Pressure (real or perceived) to protect their employment may lead individuals to report to work even at the risk of exacerbations. This may increase the severity of an exacerbation or expose the person to additional risks such as influenza or other upper respiratory infections.

The case manager needs to be aware of any employment-related issues. These may include absenteeism, or issues such as physical or emotional stress that could adversely impact the individual’s disease stability. Depending upon the employment issues encountered, the case manager may need to identify resources for the worker with COPD. There may be access to Employee Assistance Programs, liaisons in the company’s human resources department, or referral to vocational rehabilitation counselors for a more intensive intervention.
Despite the widespread disappearance of on-site occupational health nurses (OHN), many companies still employ OHN’s. These nurses can be an invaluable resource for the worker, and an important ally for the case manager. If there are no on-site personnel, many companies have contracts with occupational medication clinics that may offer support in these situations. This may include the occupational health physician’s recommendation of a modified work assignment.

Finally, as discussed earlier, may worksites contain environmental risks that expose the worker with COPD to pollutants that exacerbate their conditions. This may require a discussion with the worker, their physician, and other members of the health care team to decide if the worker is able to continue employment in the current setting. An individual’s occupation can be very important to their self-image and sense of value and importance. If this is threatened or lost, the case manager needs to be alert for symptoms of depression or other impaired coping so the worker can receive prompt attention to their mental health needs.

Cultural Issues

The individual’s cultural and socioeconomic background have a unique impact on the individual, their view of illness, their relationship with health care providers, the resources available, and their attitudes toward treatment. Part of the case manager’s assessment must focus on the person’s culture and any accommodations that may be necessary for the person to be a full participant in their care.

Areas with large multi-cultural populations often employ trans-cultural nurses or social workers to assist the health care team in delivering culturally sensitive care. At minimum the case manager should assure that the individual is able to receive any information and instruction in their language of choice. Usually, translator services are mandated and available in any health care setting. The case manager should assure that the appropriate translation services are available and present for the individual.

Another resource for assistance with cultural differences may be the local church. Many cultures maintain a connection with their cultural traditions through a community of faith. There are times when a representative of the church can assist in providing information and assistance. Of course, make sure any required permissions are obtained before sharing protected health information.

Medications and Case Management

There are multiple medication regimes for patients with COPD and
case managers are able to assist in building self-management skills around those regimens for COPD patients and their families. Case managers can access the CMAG guidelines and assist patients with building their medication knowledge. Having patients create a medicine list will begin the process. Case managers can use the Modified Morisky Scale created by CMSA as an important step in supporting medication adherence.

In the mid-1980s, Morisky and colleagues developed a brief questionnaire to aid practitioners in prospectively predicting adherence with antihypertensive medications. Subsequently, the instrument was validated in a number of studies and demonstrated to have good psychometric properties. Independent researchers have further expanded the application of this instrument to other disease states including diabetes and chronic obstructive pulmonary disease.

The 4 items and their scoring algorithm are shown in Table 8.

<table>
<thead>
<tr>
<th>Item</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Do you ever forget to take your medicine?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2.</td>
<td>Are you careless at times about taking your medicine?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3.</td>
<td>When you feel better do you sometimes stop taking your medicine?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4.</td>
<td>Sometimes if you feel worse when you take your medicine, do you stop taking it?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**The Modified Morisky Scale**

In considering application of the original Morisky Scale to CMAG, several potential deficiencies were noted. Specifically, although the original Morisky Scale had demonstrated the ability to predict medication-taking behavior as well as outcomes, it was not designed to explain persistence (the patient’s long-term continuation of therapy), which is a significant factor in the long-term management of chronic diseases. Also, the scale was not originally designed to classify patients into a high/low continuum for knowledge and motivation. Consequently, 2 new questions were added to create the Modified Morisky Scale (MMS). The MMS is shown in Table 9.
The MMS is used for patients who are already receiving medication therapies and for those who have been previously assessed with CMAG tools described in earlier chapters of these guidelines. When the MMS is used, patients are assigned to an adherence intention quadrant as follows:

Questions 1, 2, and 6, which measure forgetfulness and carelessness, are considered to be indicative of motivation (or lack thereof) and consequently impact the motivation aspects of adherence intention.

Questions 3, 4, and 5, which measure if patients stop medications and understand the long-term benefits of continued therapy, were considered to be indicative of knowledge (or lack thereof) and consequently impact the knowledge aspects of adherence intention.

By using the MMS as an indicator of both motivation and knowledge, it is possible to use the scale ratings when assigning an adherence intention quadrant for the evaluated patient.

<table>
<thead>
<tr>
<th>Question</th>
<th>Motivation</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you ever forget to take your medicine?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
<tr>
<td>2. Are you careless at times about taking your medicine?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
<tr>
<td>3. When you feel better do you sometimes stop taking your medicine?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
<tr>
<td>4. Sometimes if you feel worse when you take your medicine, do you stop taking it?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
<tr>
<td>5. Do you know the long-term benefit of taking your medicine as told to you by your doctor or pharmacist?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
<tr>
<td>6. Sometimes do you forget to refill your prescription medicine on time?</td>
<td>Yes(0)</td>
<td>No(1)</td>
</tr>
</tbody>
</table>

There are two main tools in the CMAG tools and techniques manual to aid the case manager in assessing the individual and their likely adherence issues. Both the Modified Morisky Scale and the Medical Knowledge Assessment help the case manager identify if the person has more issues with knowledge, motivation, or both.
Both of the tools are available on the Case Management Society of America’s (CMSA) website at www.cmsa.org. The case manager can obtain “clean” copies of the tools for use with their patients, or for adoption into their current documentation tools.

Medications, especially bronchodilators, are the cornerstone of COPD symptom management, and key to the management of exacerbations. Medications are also overwhelmingly misused and non-adherence is a problem of epidemic proportions. Approximately one-half of all people with prescribed medications do not adhere to the regimen prescribed. This means that medication adherence and medication management will be a key focus for case managers working with people who have COPD. As mentioned earlier, medications used to treat comorbid conditions will increase the complexity of helping people manage their medications.

Many of the medications used to treat COPD are inhaled. This tends to decrease the side effects, but is often more difficult to use than a pill. If the person is using an MDI, the actuation must be coordinated with inhalation. This is difficult for anyone, especially the elderly. As discussed previously, a holding chamber can improve this. It is also important to make sure the person receives complete instructions on proper technique, and that it is evaluated at each provider visit.

Breath-activated devices decrease the need for coordinating actuation with inhalation. The person still needs to be able to prepare and take the inhaled medication. The case manager will need to determine the person’s ability to complete this activity, or work with them to identify a resource to assist.

Long-term control medications are often used to treat COPD. People may have difficulty taking medication every day when feeling well. The case manager will need to carefully explain the role of medications in controlling their illness and the person should be able to describe their understanding of the concept that they are feeling well because of the medication, and not because the condition has resolved. Long term therapies are a particular challenge for anyone, especially when they begin to feel well. Part of the ongoing management of people with COPD should include emphasis on maintaining medication therapy and assessing their ongoing adherence.

The cost of medication, including co-pays may discourage medication use. This problem can be especially critical if the person has missed time from work, or is not working due to their COPD. The case manager will need to explore options with the individual and the health care
team. This may require the case manager to understand the medications on the person's insurance formulary and the co-pay and deductibles for different medications.

Insurers are required to cover drugs in all therapeutic classes. By informing the physician of the insurance coverage options for the person, the case manager may be able to facilitate a change by the physician to a drug that provides the person with both the desired therapeutic effect and a lower cost burden. Of course, there are times when a specific medication is the only alternative for an individual. The case manager can help identify options such as programs offered by most pharmaceutical companies for people who have a problem affording medications. Many states have programs that can assist with medications as well.

If the person can't afford the medication, or is not willing to make the financial adjustments needed to fit the medication into their budget, this will severely compromise adherence. Case managers can make every member of the health care team aware of the issue to allow for the discovery of a feasible option.

Adverse medication side effects can also impact adherence. The first step in addressing this issue is to make sure that the person is aware of any side effects of the medication. It can be very helpful for the person to understand that a side effect is expected and will diminish within a certain timeframe. Of course it is also vitally important that the person knows the side effects that signal the need to contact their provider immediately. Case managers should encourage people to report any side effects immediately. This will allow the health care team to address the issue. This may mean a discontinuation of a medication, a reduction in dosage, a change to a different medication with similar therapeutic action, encouragement and support that the effects are transient, or information about how to avoid or minimize side effects. Each prescribed medication should be reviewed with the person to allow them to describe:

- The name of the medication
- The intended effect
- The prescribed dosage
- The number of times per day it should be taken
- How long before they see the intended effect
- Common side effects
- What to do when/if side effects occur
- How to minimize common side effects
• Where and how the medication should be stored
• How much the medication costs
• How often the medication needs to be refilled
• Where to obtain medication refills
• How far in advance to order medication refills
• How long they will need to take the medication

Ask the person to bring the inhaled medication with them to their next visit. If the contact is a telephone call, ask the person to gather their medications to answer the questions.
• What medications are you taking?
• When do you take the medication?
• How do you clean the device?
• Do you have any concerns or problems with taking the medications?

The complexity of the medication schedule can lead to adherence issues. People with comorbid conditions in addition to COPD may be on complex medication schedules. These can be simplified by:
• Adjusting the medication schedule so medications are taken once or twice a day.
• Decreasing the number of medications. Several medications combine two inhaled medications in one device, which helps decrease the number of medications.
• Linking medication times with routine activities. Example: Take the medications before breakfast and dinner. In addition, keep the medication in a visible spot in the kitchen as a further reminder.
• Creating a medication list to use as a reminder. The medication list can have boxes to check when the medication is taken.
• Packing pill boxes weekly or daily when pills are taken.

Oxygen therapy

People with COPD give a variety of reasons for nonadherence. A number have been identified and include: difficulty managing the equipment, absence of dyspnea, restricted autonomy, fear the treatment wouldn’t work when really needed, and feelings of shame. Treatment options to help address these issues include:
• Selection of a combination of oxygen systems that fit the person with COPD and their activity level. Table 10 identifies advantages and disadvantages of various combinations of oxygen systems.
• Selection of an oxygen supply company that will work to address issues related to oxygen therapy including how to use the equipment, maintenance of the equipment, troubleshooting, activity, and travel with oxygen.

• Address the benefits of oxygen use. Answer questions about using oxygen and strategies to address the barriers and concerns. Use motivational interviewing strategies to help identify the source of any barriers and support the person through the process of overcoming resistance and resolving ambivalence.

<table>
<thead>
<tr>
<th>Table 10. Advantages and Disadvantages of Available Home Oxygen Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combination 1 C&gt;2 concentrator and standard flow regulator</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Combination 2 C&gt;2 concentrator, M6 or M9 cylinder with conserving device</td>
</tr>
<tr>
<td>Combination 3 Combo system: 0^ concentrator, conventional liquid stationary and portable</td>
</tr>
<tr>
<td>Combination 4 Conventional liquid oxygen stationary and portable</td>
</tr>
<tr>
<td>Combination 5 Conventional liquid oxygen stationary, portable and conserving device</td>
</tr>
<tr>
<td>Combination 6 Personal liquid oxygen system</td>
</tr>
<tr>
<td>Transfilling oxygen systems</td>
</tr>
<tr>
<td>Portable oxygen concentrator</td>
</tr>
</tbody>
</table>

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http://www.nlhep.org/resources/Prescrb-Hm-Oxygen/home-oxygen-options-4.html

Use of a portable pulse oximeter by the person with COPD to assess oxygen level during various activities. This is a helpful self-management strategy that allows people to see the relationship between their symptoms and their oxygen saturation levels. It can also help people with COPD become very astute in identifying symptoms early before they progress to an exacerbation.
Suggested Questions for People on Oxygen Therapy

- When do you use your oxygen?
- How much oxygen are you using?
- Do you use a pulse oximeter to monitor your oxygen level?
- What oxygen system are you using at home and with activity?
- What is the name of your oxygen supply company?
- Do you have any concerns or problems with oxygen therapy?

Adherence Assessment for Smoking Cessation

The addictive properties of smoking are well-documented. The physical addiction coupled with the strong psychological appeal and habits make smoking cessation a tremendous adherence challenge. Smokers unwilling to quit are a key challenge. These patients would be generally a Quadrant 3 AI or a Quadrant 1 AI. Q3 patients know the risks, but lack the motivation. Q1 patients are unaware of the risks and lack motivation. For a more detailed discussion of Quadrant Assignment and Planning, see page 33.

The U.S. Department of Health and Human Services describes the “5 Rs.”

- Relevance - evaluate the personal relevance of quitting
- Risks - ask the patient to identify negative consequences of smoking
- Rewards - what does the patient see as benefits
- Roadblocks - what impediments are there to the patient quitting
- Repetition - Motivational interviewing should be used at every contact. Also, the case manager should inform patients that it takes multiple attempts to quit.

Common Resistive Behaviors

Negating: Examples of this behavior include blaming, disagreeing, excusing, minimizing, claiming impunity, pessimism, reluctance, and unwillingness to change. This involves statements such as “Well, everyone has to die from something.”; “My grandfather smoked and he lived to be ninety years old.” “I have tried many times before and I just can’t do it.” “Don’t talk to me about my smoking.”

Patients need to be able to resolve ambivalence. With the dangers of smoking well-documented, it is likely that, over time, they have used these thoughts and beliefs to help them reconcile the risks of smoking.
with their knowledge of the dangers. These thoughts may have prevented them from seeing the real risks of continuing the behavior or any rewards from quitting.

**Arguing:** This behavior is often revealed as challenging, discounting, and hostility. Patients that are in argumentative resistance may challenge the case manager’s right to even ask about smoking. “This is none of your business.” They may rant about their rights and the societal pressures of smoking. “What are they going to do next, put smokers in prison?” “This is a free country, and I can do what I want.” It is important to avoid arguing with patients that exhibit this kind of resistance. Arguing forces the patient to defend their position and support the very behaviors you are encouraging them to change. Additionally, arguing does not set the stage for collaboration. Sometimes expressing empathy can help when a patient is argumentative. Be sure that your empathetic statements are sincere. For example, “I can understand your feeling a lot of pressure to change. That must be upsetting.”

**Interrupting:** Disrupting or interrupting the case manager each time the subject of smoking cessation arises can signal a desire to avoid a discussion and resist change efforts. In this case, confronting the behavior might be helpful. “Every time I bring up smoking you seem to change the subject.” This may lead the patient to elaborate on their resistance. Even if the answer is a simple, “yes, I don’t want to discuss it”, the case manager now knows the patient’s level of motivation is very low.

**Ignoring:** Failure to follow through on smoking cessation activities can signal resistance. Many times a patient doesn’t want to confront or disappoint a health care professional. This may lead them to agree to complete tasks for which there is no motivation.

Although most health care professionals view resistance as a negative experience, it is actually a source of information. The person’s resistance tells us a lot about the areas of the treatment plan that are still unresolved for them. A caution in dealing with resistance; if the person is vigorously resisting the case manager’s efforts, the case manager should try a different avenue of approach. Simply put - the more you push, the more they resist. Try backing off from the topic or approaching it differently. For example, “It seems that we aren’t really making much progress here, can we discuss this at another time?”
REALM-R

As with any knowledge assessment, it is important to identify health literacy challenges. Smoking cessation is no exception. Reading materials and other educational resources should be appropriate to the patient’s reading level. The Rapid Estimate of Adult Literacy in Medicine, Revised (REALM-R) is a well-validated tool used for health literacy assessment (description available at http://www.adultmeducation.com/AssessmentTools_1.html). Patients with a low score on the REALM R will need special attention to assure reading levels are appropriate for the patient or reading alternatives are available.

Medication Knowledge

Medications used to treat COPD and components of COPD education were discussed previously. In this section, the focus will be on the use of medications related to smoking cessation. Individuals should be assessed to determine their knowledge of the medications. In general, women who are pregnant should not use nicotine replacement therapy (NRT) products or other pharmaceutical treatments for smoking. Side effects from nicotine replacement may vary based upon delivery method. The Food and Drug Administration (FDA) has approved 5 types of nicotine replacement therapy:

Nicotine Gum

People need instruction regarding the action of nicotine gum. Nicotine gum delivers nicotine to the brain more quickly than the patch; however, unlike smoke, which passes almost instantaneously into the blood through the lining of the lung, the nicotine in the gum takes several minutes to reach the brain. This makes the "hit" less intense with the gum than with a cigarette.

• Nicotine gum is not designed to be chewed like normal gum. Rather it is used in the "chew and park" method. When a person inserts a piece of gum into their mouth, they should chew it a few times to break it down, then park it between their gum and cheek and leave it there. The nicotine from the gum will make its way into their system via the blood vessels just under the lining of the oral cavity. If they continue chewing without parking, the nicotine will be
released directly into the saliva in the mouth, which will eventually be swallowed, leaving them with a stomachache and a craving for a cigarette.

- Nicotine gum contains enough nicotine to reduce the urge to smoke. The over-the-counter gum is available in 2mg doses (for smokers of 24 or fewer cigarettes each day) and 4mg doses (for smokers of 25 or more cigarettes each day). One piece of gum is one dose; maximum dosage should not exceed 24 pieces per day.

- Nicotine gum helps take the edge off cigarette cravings without providing the tars and poisonous gases found in cigarettes. It is a temporary aid that reduces symptoms of nicotine withdrawal after quitting smoking.

- Nicotine gum must be used properly in order to be effective. Steps for nicotine gum users include:
  - Stop all smoking when beginning the nicotine gum therapy.
  - Do not eat or drink for 15 minutes before using, or while chewing the gum (some beverages can reduce its effectiveness).
  - Chew the gum slowly on and off for 30 minutes to release most of the nicotine. Parking the gum between the cheek and gum allows the absorption of nicotine into the lining of the cheek.
  - Chew enough gum to reduce withdrawal symptoms (10-15 pieces a day but no more than 30 a day).
  - Use the gum every day for about a month or so, then start to reduce the number of pieces you chew a day, chewing only what you need to avoid withdrawal symptoms.
  - Discontinue use of gum after three months.
  - If the gum sticks to dental work, stop using it and check with a medical healthcare professional or dentist. Dentures or other dental work may be damaged because nicotine gum is stickier and harder to chew than ordinary gum.

**Nicotine Lozenges**

- Nicotine lozenge comes in the form of a hard candy, and releases nicotine as it slowly dissolves in the mouth. Eventually the quitter will use fewer and fewer lozenges during the 12-week program until he or she is completely nicotine-free. Biting or chewing the lozenge will cause more nicotine to be swallowed quickly and result in indigestion and/or heartburn.

- Nicotine lozenge is available in 2 mg or 4 mg doses. One lozenge is one dose; maximum dosage should not exceed 20 lozenges per day.
• Each lozenge will last about 20-30 minutes and nicotine will continue to leach through the lining of the mouth for a short time after the lozenge has disappeared. Do not eat or drink 15 minutes before or during lozenge use.

• Do not use nicotine lozenges for longer than 12 weeks. If there is a need to continue using the lozenges after 12 weeks, contact the healthcare professional.

• The most common side effects of lozenge use are:
  - Insomnia
  - Gastrointestinal upset (nausea, hearburn, flatulence)
  - Hiccups
  - Headache
  - Coughing

Nicotine Nasal Spray

• Nicotine nasal spray, dispensed from a pump bottle similar to over-the-counter decongestant sprays, relieves cravings for a cigarette.

• Nicotine is rapidly absorbed through the nasal membranes and reaches the bloodstream faster than any other NRT product, giving a rapid nicotine “hit”. This feature makes it attractive to some highly dependent smokers.

• The most common side effects due to the nasal spray are nose and throat irritations and watery eyes.

• A usual single dose is two sprays, one in each nostril. The maximum recommended dose is 5 doses per hour or 40 doses total per day.

Nicotine Inhaler

• The nicotine inhaler consists of a plastic cylinder containing a cartridge that delivers nicotine when puffed on. Use the inhaler for cigarette cravings. Use no more than 16 cartridges a day for up to 12 weeks.

• Although similar in appearance to a cigarette, the inhaler delivers nicotine into the mouth, not the lung, and enters the body much more slowly than the nicotine in cigarettes. The nicotine inhaler is available only by prescription.

• Each cartridge delivers up to 400 puffs of nicotine vapor. It takes at least 80 puffs to obtain the equivalent amount of nicotine delivered by one cigarette.
• The initial dosage is individualized. The best effect is achieved by frequent, continuous puffing for 20 minutes. One cartridge will last for 20 minutes of continuous puffing and deliver 4 mg of nicotine; only 2 mg are actually absorbed. This is the equivalent of about 2 cigarettes. The maximum suggested dose is 16 cartridges per day.

• Side effects include irritation of the throat and mouth in the beginning. On initial use, there may be cough but it should subside after regular use.

Nicotine Patches (transermal nicotine systems)^36

Patches give a measured dose of nicotine through the skin. Individuals are weaned off nicotine by switching to lower-dose patches over a course of weeks. Patches can be bought with or without a prescription. Many types and different strengths are available. Materials provided with the patches describe how to use the product, and list special considerations and possible side effects.

For the light-to-average smoker, a 16-hour patch works well and is less likely to cause side effects like skin irritation, racing heartbeat, sleep problems, and headache. It does not deliver nicotine during the night, so it may not be right for those with early morning withdrawal symptoms.

The 24-hour patch provides a steady dose of nicotine, avoiding peaks and valleys. It helps with early morning withdrawal. This patch may have more side effects like disrupted sleep patterns and skin irritation. Depending on body size, most smokers should start using a full-strength patch (15-22 mg of nicotine) daily for 4 weeks, and then use a weaker patch (5-14 mg of nicotine) for another 4 weeks. The patch should be put on in the morning on a clean, dry area of the skin without much hair. It should be placed below the neck and above the waist -- for example, on the upper arm or chest. The FDA recommends using the patch for a total of 3 to 5 months.

Side effects are related to:

• the dose of nicotine
• the brand of patch
• skin characteristics (such as the person’s tendency to have a skin reaction to the patch)
• how long the patch is used
• how it is applied
Side effects from wearing the patch may include:
- skin irritation (redness and itching)
- dizziness
- racing heartbeat
- sleep problems
- headache
- nausea
- vomiting
- muscle aches
- stiffness

Non-nicotine replacement therapy medications

Currently there are two FDA approved non-nicotine medications for smoking cessation. Other non-FDA-approved medications are available and have also been shown to be effective for treating smokers. Case managers should reference the current literature and the manufacturers’ product inserts for additional information regarding the method of action, relative effectiveness, side effects and drug-drug interactions.

Nonpharmacologic Methods for Smoking Cessation

Of course, nicotine replacement therapy or medications that can assist the person to quit smoking are not the only option. There are numerous programs available to persons who chose not to or are unable to use medications. There are nonpharmacologic options.

There are programs providing telephone support where the person can call a quit line and speak to a counselor or where a counselor contacts them. Studies have shown that combining this with pharmacologic therapy does increase quit rates over either intervention alone. There are also online support programs via the internet, but there have not been any studies to understand the advantages or success of these programs.

Cognitive therapy programs that address behaviors commonly associated with smoking are available. The programs focus on development of coping strategies to help smokers change habits and increase their motivation to quit. These can be individual or group activities. There is a strong correlation between the amount of counseling time and success rates.
Hypnotherapy has been used by some individuals. Hypnotherapy is felt to lower the desire to smoke or increase the will to quit. Although there are no clinical trials that demonstrate the effectiveness, it may be useful for some individuals.

There are other treatments such as acupuncture, acupressure, and electro-stimulation, although they have not shown these to be more effective than placebos. However, the designs of these studies are poor, and there is not enough evidence to dismiss these interventions entirely. See http://www.oncolink.org/resources/article.cfm?c=1&s=25&ss=92&id=992 for more information.

Social Support and Smoking Cessation

Social support is a critical component of successful smoking cessation plans. When administering the Social Support Questionnaire, make sure the individual understands that you are surveying the amount of support for smoking cessation. The case manager should provide assistance in helping the patient develop a support system. Encourage them to enlist the support of friends and family in their smoking cessation attempt. This may include encouraging others in the house who smoke to quit with the patient.

Readiness Ruler

Assess the patient’s motivation to quit smoking and their confidence in their ability to quit using the readiness ruler. Patient’s who rate themselves 0-4 are at a very low motivational level. When a patient is unwilling to quit, it is still acceptable and encouraged to advise them to quit. The case manager can say, “As a health care professional, I want you to know that quitting smoking is the most important thing you can do for your health now and in the future.”

In addition, motivational interviewing can be used to move a patient from not being willing to consider smoking cessation to thinking about it. For example, a case manager might say, “Why is quitting smoking something you are unwilling to consider?” This may encourage the patient to verbalize some barriers and beliefs that can provide
information regarding possible motivational influences to explore. Likewise, some patients may express a very low interest due to past failures. They may want to stop smoking, but due to a history of failed attempts, they do not believe they can succeed.

It is important information for the patient to know that it takes many people an average of 5-7 attempts to quit smoking. Discussing the patient’s past smoking cessation attempts can help the case manager discover opportunities for improving the chances that the patient will be successful in future attempts.

Patients who rate themselves as 5-7 are contemplating change. It is important at this stage to help them identify barriers to moving forward in their attempts to quit smoking. Ask the patient what they have been thinking about doing. Have them describe the motivational factors that are causing them to consider making the change. Use motivational interviewing techniques to help move the patient from thought to action.

Patients who rate themselves from an 8-10 are prepared to make a change. At this point the case manager should work with the patient to develop a specific action plan. Have the smoker establish a quit date within the next 2 weeks. Work with them to anticipate challenges to their attempts. Social situations, especially those where alcohol is served can be quite a challenge for the newly smoke-free. Talk about nicotine withdrawal symptoms. Statistics say that most people are more successful when they add medications to their smoking cessation plan. When patients use medications as a part of their quit plan, the success rates are between 25-33%.

**CASE MANAGEMENT AND COPD IN VARIOUS PRACTICE SETTINGS**

**Hospital Case Managers**

Hospital case managers have a key role in managing the episode of illness in the inpatient setting. Some case management models include utilization management. Case managers have a key role in determining that the patient is at the appropriate level of care within the hospital and even if they are appropriate candidates for any type of acute care. Most case management roles have responsibility to assure that the appropriate clinical guidelines have been followed and that the care provided during the stay adheres to the hospital's guidelines. The
hospital case manager is often responsible for communication with case managers in other practice settings such as managed care, long term care, or home health as the patient transitions from one setting to another. The inpatient case manager is often tasked with getting authorization for discharge care. Many times they have a large role in the discharge planning efforts for the patient. Key to dealing with COPD patients is seeing that they have a case management connection once they leave the hospital. They should contact the patient’s health insurance carrier to determine if case management is available and refer the patient for ongoing care. Another critical element is to ensure that patient post-hospitalization appointments are secured with the primary care physician and/or specialist.

**Managed Care Case Managers**

Case managers in managed care plans also have a variety of roles. As with their colleagues in inpatient care, they may or may not have responsibility for utilization management activities. They may be the person on the other end of the telephone who will be granting approval for an inpatient stay and determining that the patient continues to meet criteria for care at an inpatient level. It will be important for these case managers to understand the inpatient management of COPD exacerbations in order to confirm their member is getting the appropriate care.

Frequently, members with COPD end up meeting trigger criteria for referral to case management in a managed care case management program. The trigger may be diagnosis driven or resource utilization driven, but COPD patients tend to meet one or both of these thresholds. The case manager at the managed care plan has an advantage over their inpatient colleague. The managed care case manager has access to claims payment data. This data can reveal the member’s medication use, physician visit activity, hospital admissions, emergency room visits, home health use, oxygen use, and other patterns of information that can provide great insight into the member’s overall treatment and adherence. The data, combined with their member interaction, provides them with an opportunity to see the gaps in care and address them.

Some managed care plans have disease management programs specifically for COPD members that will assume the management of the member’s care or coordinate with the case manager to assure the member receives recommended care and prevention related to their COPD diagnosis. Managed care case managers should communicate with their inpatient colleagues when a member is admitted. They can provide valuable information into the member’s adherence when not hospitalized and collaborate to create a successful discharge plan.
Home Health Case Managers

Access to the patient in their home environment offers unique advantages to the home health case manager. The act of being invited into a patient’s home and sitting with them face to face helps to create bonding and rapport that is difficult for either the managed care case manager (if telephonic only) or the hospital case manager who encounters the patient in the unfamiliar and unnerving hospital setting. This often provides the home health case manager (HHCM) with the opportunity to learn more about the patient’s barriers to adherence and areas of ambivalence. The HHCM may be the only member of the health care team with which the patient has shared key information regarding their reactions to the required treatment and their role in self-management.

In one case, the HHCM was the only member of the health care team that knew the patient was planning to travel internationally at a time when their condition was very unstable. The trip was one that was being made out of the patient’s sense of religious obligation. The HHCM communicated this information with the team who contacted the patient’s priest. The priest was able to counsel the patient with regard to the religious obligation and the patient did not leave the country. This intervention allowed the patient to feel at peace with their spiritual values and still maintain appropriate management of their health status.

The HHCM is also in the position of assessing the patient’s home environment for safety and adequacy. Many times serious safety concerns can be identified and addressed via the HHCM. They can assist the patient in organizing their environment to promote successful management of their disease, and can help them master the skills in the very place they are needed.

The HHCM is in a very unique position to support the patient and their family in understanding and reinforcing their medication regime and inhaler technique. They also are the bridge for promoting adherence and reinforcement for the patient by supporting the treatment options with the primary care provider and/or pulmonologist. The communication link is enhanced through the HHCM and their ability to coordinate the sending and receiving of information between the collaborative clinical team.

The HHCM can reinforce the medication regimen through regular review with the patient and family. Further, the HHCM can assist in creating an environment that aides in success. Things such as how and where the medications are stored can aid memory and develop
appropriate medication taking behaviors. The HHCM can demonstrate cleaning equipment in the patient’s home environment using the tools they have on hand. This can help the person to adhere through making the actions relevant within their environment.

Many times the HHCM can identify issues that can lead to exacerbations. They often serve as the “eyes and ears” of the treating physician in the patient’s home environment. Many times individuals with COPD have comorbidities that complicate management of their condition, increase the likelihood of exacerbations, and cause adverse medication effects or interactions. The HHCM can be invaluable in communicating how the patient is managing in their home environment. They can assist in monitoring the comorbid conditions in relation to the COPD and as separate disease states when needed.

Other Case Management Settings

Case managers in skilled nursing facilities and other long term care settings frequently encounter patients with COPD. They often encounter patients as they transition from the hospital to home and are in a position to reinforce the early post-discharge instructions and to prepare the patient for transition to their home.

Case managers, regardless of their practice setting, are likely to encounter patients with COPD. By focusing on the opportunities provided in their setting and linking the patient with the case manager in their next setting, they are maximizing their contribution to assisting the patient to achieve optimal self-management.

Successful Discharge

Many organizations have begun to recognize the need for successful transitions in care. The Case Management Association of America chairs the National Transitions of Care Coalition. (www.ntocc.org) NTOCC was created to address the many issues in transitions of care, when people move from one care setting to another. The website contains tools for both health care professionals and patients to assist in the transition of care.

In people with COPD, hospitalization is often related to an exacerbation. This indicates that the person has had a change in severity of illness or has not been effective in managing their disease and symptoms. As an integral part of the health care team, the case manager can play a major role in ensuring a successful discharge. Boston University School of Medicine has been involved in the
“reengineered discharge,” often referred to as Project RED. Project RED was funded by the Agency for Health Care Research and Quality (AHRQ) and the National Heart, Lung, and Blood Institute (NHLBI). The components, along with complete details and publications regarding the project are available on the web at https://www.bu.edu/fammed/projectred/index.html

Components of the Re-Engineered Discharge (RED)37

1. Educate the patient about his or her diagnosis throughout the hospital stay. With COPD this would include information on the nature of COPD, complications, self-management, and exacerbation prevention.

2. Make appointments for clinician follow-up and post-discharge testing and
   - Make appointments with input from the patient regarding the best time and date of the appointment, be aware that sometimes a person will agree to an appointment because they are concerned about inconveniencing the staff even though they know they may not be able to keep the appointment. Make sure the appointment is at a time to which the person can commit, and make sure they know how to change the appointment if needed.
   - Coordinate appointments with physicians, testing, and other services. The case manager can work with the team to make sure testing is done prior to an appointment, if needed for decision-making during the visit. They can also make sure current, relevant testing results accompany the person to the appointment to minimize the need to repeat costly procedures.
   - Discuss reason for and importance of physician appointments. If the person doesn’t understand the need for or importance of the appointment, they may not attend or delay the visit beyond the time limits of safety.
   - Confirm that the patient knows where to go, has a plan about how to get to the appointment; review transportation options and other barriers to keeping these appointments. Transportation logistics are a frequent reason for missed appointments as many people do not have reliable transportation. Persons dependent upon public transportation may not feel up to the task of going to an appointment if they are not feeling well. Ironically, this is the time when keeping an appointment is most critical. Some Medicaid programs, managed care programs, and state agencies have funding...
available for transportation. Hospitals may be able to provide transportation vouchers if there are no other available options. Churches may offer programs to give rides to members of their congregations or other community members.

3. Discuss with the patient any tests or studies that have been completed in the hospital and discuss who will be responsible for following up the results. With the increasing use of hospitalists and intensivists, there can be a lapse in time from discharge to reconnection with the individual’s regular medical team. The advent of the Electronic Health Record is helping to make communication of these results more timely and available. However, the accountability must be established prior to discharge.

4. Organize post-discharge services.
   - Be sure patient understands the importance of such services.
   - Make appointments that the patient can keep.
   - Discuss the details about how to receive each service.

5. Confirm the medication plan.
   - Reconcile the discharge medication regimen with medications taken before the hospitalization.
   - Explain what medications to take, emphasizing any changes in the regimen. There are numerous tools available to assist with this intervention. Tools are available on the NTOCC site and the RED site along with numerous other sites related to medication reconciliation.
   - Review each medication’s purpose, how to take each medication correctly, and important side effects. With COPD, this will include instruction and return demonstrations on the use of inhaled medications.
   - Be sure patient has a realistic plan about how to get the medications. This includes the money to obtain the prescriptions. Also, although more rare than in previous times, some pharmacies will still deliver. Some insurance programs also provide mail order options with rapid delivery times for people who are not able to make regular trips to the pharmacy.

6. Reconcile the discharge plan with national guidelines and critical pathways. In the case of COPD, the GOLD Guidelines are a comprehensive review of recommended treatment and follow up.
7. Review the appropriate steps for what to do if a problem arises.
   • Instruct on a specific plan of how to contact the primary care physician (or coverage) by providing contact numbers for evenings and weekends.
   • Instruct on what constitutes an emergency and what to do in cases of emergency. This is especially important in COPD where symptom management is critical, and where symptoms can soon become a full blown exacerbation if not managed.

8. Expedite transmission of the discharge resume (summary) to the physicians (and other services such as the visiting nurses) accepting responsibility for the patient’s care after discharge that includes:
   • Reason for hospitalization with specific principal diagnosis.
   • Significant findings. (When creating this document, the original source documents - e.g., laboratory, radiology, operative reports, and medication administration records - should be in the transcriber’s immediate possession and be visible when it is necessary to transcribe information from one document to another.)
   • Procedures performed and care, treatment, and services provided to the patient.
   • The patient’s condition at discharge.
   • A comprehensive and reconciled medication list (including allergies).
   • A list of acute medical issues, tests, and studies for which confirmed results are pending at the time of discharge and require follow-up.
   • Information regarding input from consultative services, including rehabilitation therapy.

9. Assess the degree of understanding by asking them to explain in their own words the details of the plan.
   • May require removal of language and literacy barriers by using professional interpreters.
   • May require contacting family members who will share in the caregiving responsibilities.

10. Give the patient a written discharge plan at the time of discharge that contains:
    • Reason for hospitalization in language that the person can understand.
• Discharge medications including what medications to take, how to take them, and how to obtain the medication. Make sure that the person's literacy level is considered when developing the list. Symbols to indicate the time of day and color coding on the labels can help the person follow the chart if they have low literacy levels.

• Instructions on what to do if their condition changes.

• Coordination and planning for follow-up appointments that the patient can keep.

• Coordination and planning for follow-up of tests and studies for which confirmed results are not available at the time of discharge.

11. Provide telephone reinforcement of the discharge plan and problem-solving 2-3 days after discharge. This is usually the hallmark of a case management program. Make sure that contact with newly discharged people occur within the 48-72 hour time frame. Some groups use a post-hospital script or check list to make sure all relevant information is reviewed and addressed.

Below are the specific discharge criteria for patients with COPD exacerbations.1

• Inhaled β₂-agonist therapy is required no more frequently than every 4 hrs.

• Patient, if previously ambulatory, is able to walk across room.

• Patient is able to eat and sleep without frequent awakening by dyspnea.

• Patient has been clinically stable for 12-24 hrs.

• Arterial blood gases have been stable for 12-24 hrs.

• Patient (or home caregiver) fully understands correct use of medications.

• Follow-up and home care arrangements have been completed (e.g., visiting nurse, oxygen delivery, meal provisions).

• Patient, family, and physician are confident patient can manage successfully at home.

**OUTCOMES IN COPD**

As discussed earlier, the NCQA has implemented measurements of the effectiveness of COPD management in the HEDIS Guidelines. The
The current measure looks to determine the number of individuals age 40 and older who have a new diagnosis of COPD who received spirometry testing to confirm the diagnosis. While this is a process measure at this point in its evolution, it does promote the use of spirometry for people who are diagnosed with COPD.\(^2\) Another HEDIS measure, titled Pharmacotherapy Management of COPD Exacerbation, determines bronchodilator and systemic corticosteroid utilization for COPD patients age 40 years and older who have an emergency room visit or are admitted for inpatient hospitalization. The National Quality Forum (NQF) produced a compilation of various quality measures, the organizations responsible for the measures, and those measures that were NQF endorsed and Ambulatory Quality Alliance (AQA) approved. While asthma and acute pharyngitis were the focus of the measures of respiratory care, there were several other measures that would apply to people with COPD. These include medication reconciliation, advance care planning, adherence to chronic medications, immunizations, smoking cessation counseling, and physical activity.

The Joint Commission has a certification program for management of the patient with COPD. It was developed in cooperation with the American Lung Association. The Joint Commission’s Certificate of Distinction for Chronic Obstructive Pulmonary Disease recognizes organizations that make exceptional efforts to foster better outcomes for COPD patients.\(^{38}\)

Certification signifies that the services provided have the critical elements to achieve long-term success in improving outcomes. It is the best signal to the community that the quality of care provided is effectively managed to meet the unique and specialized needs of COPD patients. In fact, demonstrating compliance with these national standards and performance measurement expectations may help obtain contracts from employers and purchasers concerned with controlling costs and improving productivity. Additional information and requirements can be obtained from the Joint Commission Website.\(^{39}\)

URAC Patient Safety Standards identify that Utilization Management (UM) is widely used in the health care industry as a tool for care management oversight. Patient safety issues may offer additional potential for demonstrating improved outcomes in COPD management. URAC provides the following as potential opportunities for UM involvement and contribution to improved patient safety outcomes:\(^{40}\)
• UM organizations provide health care management across a variety of health care settings. UM organizations may be positioned to incorporate patient safety oversight programs into their operations.

• Opportunities to promote patient safety may be present in each phase of the UM process.

• Each phase of the UM process contains different opportunities for data collection, comparison of findings to expected clinical pathways, and monitoring for patient safety risks.

• UM is often closely linked to case management and disease management programs. This may present opportunity to use UM as a tool to refer high risk patients for more intensive care management interventions.

SUMMARY

The COPD CMAG guidelines are intended to help all case managers who work with individuals with COPD by providing up to date knowledge of the condition and its management. It is intended to allow case managers to use the tools and techniques of the case management adherence guidelines more effectively with the COPD population by providing specific examples in this group. It also identifies some of the more common problems in COPD management that helps the case manager recognize opportunities to use the guidelines.

It is our hope that use of the guidelines will result in earlier identification of patients with COPD and decrease the incidence of inaccurate diagnosis. Once the diagnosis is made, we hope the guidelines will allow case managers to advocate for their patients to assure their care is consistent with best practice and the established standards of care.
**APPENDIX 1:**

**References**


40 Greenberg L, Schloss S. URAC Patient Safety Capabilities of Utilization Management Programs.
APPENDIX 2:
Case Study

The following case study highlights how select CMAG tools are utilized by the case manager for a middle-aged woman who was discharged from the acute care facility post COPD exacerbation. Patient responses may be used by the case manager to determine educational needs and to develop/support her plan of care. Each aspect of the treatment plan requires an assessment of the patient’s knowledge and motivation. This patient has a lengthy list of treatment needs, comorbidities, and social challenges.

Patient Presentation and History

• 57-year-old white, anxious woman presented to her primary care physician with complaints of increasing dyspnea on exertion. She showed signs and symptoms of a lung infection-productive cough, sputum greenish-yellow in color, increased dyspnea, and oral temperature (100.8°F).

• Comorbidities:
  - Diabetes Type 2
  - Osteoporosis
  - Coronary artery disease
  - Depression
  - Obesity - BMI 36

• Past surgical history
  - Angioplasty x2 with drug-eluting stents
  - Laparoscopic cholecystectomy

• Previous inpatient hospitalizations
  - Pneumonia
  - Unstable angina

• Current medications prescribed to address comorbid conditions
  - Known history of medication non-adherence

• Social history
  - Current smoker - 30 pack-year history
- Occasional alcohol consumption
- Divorced, 2 adult children
- Part-time employment: waitress. Had to cut back hours because of decreased stamina

- Based on presenting symptoms, her primary care physician admitted her to the hospital with a new diagnosis of COPD with exacerbation
  - 5-day length of stay
  - Pulmonary consultation
  - Chest X-Ray - indicative of emphysema (obvious bullous disease)
    - Other diagnoses ruled out
  - Post-bronchodilator spirometric results
    - $FEV_1/FVC = 65\%$, $FEV_1 = 55\%$ of predicted value for age, sex and size
  - Arterial Blood Gases (ABGs) and Oximetry Testing
    - Oxygen saturation = 86\%

- Post-discharge instructions related to COPD management
  - Outpatient pulmonary rehabilitation referral
  - Referral to local support group
  - Prescriptions for rescue/maintenance bronchodilators, systemic corticosteroids, and antibiotics
  - Smoking cessation counseling and prescription for non-nicotine replacement therapy
  - Nutritional consult for weight loss
  - Influenza and pneumococcal immunization
  - Case management referral
  - Followup with pulmonologist in 3 weeks for evaluation and treatment plan
    - Repeat ABGs to evaluate the need for long term oxygen therapy
Case Management Intake and Assessment

The case manager should complete an assessment using their organization's assessment tool and incorporating the CMAG assessment tools (if not included). Since there is nothing in the information received to determine her educational level, administration of the REALM-R would be a good first step to determine her health literacy level. She has a rather complicated medical history with a number of comorbidities. In addition, she has a complex post-discharge plan. There is a history of medication nonadherence and she continues smoking, which indicates a low motivation level. Here is a review of the medication knowledge survey.

1. Maintenance Inhaler:

Inhaled medications present a particular challenge for patients, and education should include a patient demonstration of inhaler technique. Use of a spacer device may improve effectiveness. There are numerous brands and types of spacers that can be used. The case manager should identify the patient's insurance coverage for the medication and spacer. Coverage questions should include: whether the medication is on the insurer's formulary, the medication tier (patients may have a higher co-payment for different tier level medications), the patient's co-payment, affordability for the patient, insurance coverage for a spacer, types of spacers, and replacement frequency. Once the insurance issues are identified and resolved, the case manager should make sure the patient understands how to care for the spacer.

2. The medication assessment should cover all of the prescribed medications and include the patient's knowledge of the following:

   a. Does patient know the name of the medication?
   b. What is the dosage of the medication, and how often is it to be used?
   c. Does the patient understand the purpose of the medication? Why is she using it? What is it supposed to do for her condition?
   d. What are the things she should watch for to determine the medication is working?
   e. What are some of the adverse effects she may see, and what should she do if she should experience any of these adverse effects? Are there things she can do to minimize any of the effects? When should she contact her physician?
   f. How long does she have to continue to take the medication?
   g. How often does the medication need to be refilled? When is the next refill due? Where will the patient get their next refill?

3. Although these steps are listed sequentially in this example, opportunities may present themselves in the conversation. For example, if in reviewing any of the medications the patient expresses resistance, this may be an opportunity to explore the source.
4. Each aspect of the treatment plan requires an assessment of the patient’s knowledge and motivation. This patient has a lengthy list of treatment needs, comorbidities, and social challenges.

**Readiness Ruler**

Since this person has so many comorbidities, it is critical to determine her readiness to address each of these conditions. The diagnosis of depression is likely to undermine some of the confidence she may have in her ability to cope with the many demands. In addition, her stamina has been compromised by her COPD.

In using the readiness ruler with this individual it would be recommended to go beyond assessing how important and/or willing she is to make the changes needed and adhere to the plan of care. It would be important to assess her confidence as well. She may know she needs to change and even why. She may even be willing to change. However, if she is not confident that she can change, it will decrease the chances of success.

“Ms. X, there are certainly a lot of things you are going to be doing to manage your health. If I were to ask you how confident you are that you can do the things we’ve discussed on a scale from 1 to 10, where 1 means there is no way you can do it to where 10 means you have no doubts about your ability to do it, where would you rate yourself?”

As with willingness and importance, the case manager would respond with the appropriate response to elicit additional information. For example, if Ms. X rated herself a “2”, the case manager may ask her why she didn’t rate herself a “1”, or what would it take for her to get to a “3”. These are likely to elicit the strengths and/or barriers that she sees. The case manager can then use this information to do additional questioning and provide more specific and relevant information to Ms. X.

The readiness ruler is a great tool for taking the individuals “adherence temperature.” Are they hot or cold in their readiness, perception of importance, and confidence, or are they hot to get going?

**Social Support**

How does Ms. X perceive her social support system? She is divorced with children. Using the social support questionnaire the case manager will be able to assess her satisfaction with the amount of support she receives from friends and family. Areas where the patient has lower scores could be explored similarly to the readiness rule. For example, you rated this question a “2.” What would it take to get to a “3”? This allows the case manager to explore the person’s support needs while allowing Ms. X to share what she needs without revealing things about her relationships she may not be ready to share. For example, “Well, to be a “3”, I would need to see my daughter more often.” She doesn’t have to divulge a strained relationship with her daughter until she is ready or willing.
With her reduced work hours, divorce, and grown children, she may be at risk of some social isolation. It is important to ensure she has the social support she feels she needs. If not, the case manager could help her explore some options for meeting those needs. The physician has ordered her referral to a support group. The assessment of social support may help her determine the value of a support group in her social support structure. If she refuses to go, at least the case manager has opened the door by creating a small amount of dissonance with her current level of support.
**APPENDIX 3:**

**The COPD Population Screener™**

The COPD Population Screener™ (COPD-PS™) is an easy-to-use validated tool designed to help identify those at risk for COPD in a general population aged 35 and older. Clinical diagnosis of COPD is confirmed with spirometry. More information can be found at www.copd screener.com.

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This survey asks questions about you, your breathing and what you are able to do. To complete the survey, mark an X in the box that best describes your answer for each question below.

1. During the past 4 weeks, how much of the time did you feel short of breath?
   - None of the time
   - A little of the time
   - Some of the time
   - Most of the time
   - All of the time

2. Do you ever cough up any “stuff,” such as mucus or phlegm?
   - No, never
   - Only with occasional colds or chest infections
   - Yes, a few days a month
   - Yes, most days a week
   - Yes, every day

3. Please select the answer that best describes you in the past 12 months. I do less than I used to because of my breathing problems.
   - Strongly disagree
   - Disagree
   - Unsure
   - Agree
   - Strongly agree

4. Have you smoked at least 100 cigarettes in your ENTIRE LIFE?
   - No
   - Yes
   - Don't know

5. How old are you?
   - Age 35 to 49
   - Age 50 to 59
   - Age 60 to 69
   - Age 70+

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**How to score the survey:** In the spaces below, write the number that is next to your answer for each of the questions. Add the numbers to get the total score. The total score can range from 0 to 10.

\[
\text{TOTAL SCORE} = \frac{#1 + #2 + #3 + #4 + #5}{5}
\]

If your total score is 5 or more, your breathing problems may be caused by chronic obstructive pulmonary disease (COPD). COPD is often referred to as chronic bronchitis and/or emphysema and is a serious lung disease that slowly gets worse over time. While COPD cannot be cured, it is treatable.

Please share the completed survey with your doctor. The higher your score, the more likely you are to have COPD. Your doctor can help evaluate your breathing problems by performing a simple breathing test, also known as spirometry.

If your total score is between 0 and 4, and you experience problems with your breathing, please share this survey with your doctor. Your doctor can help evaluate any type of breathing problem.

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